SECTION 300.00 – LABORATORY OPERATIONS

The *Code of Federal Regulations, Title 23, Section 637*, states that "after June 29, 2000 all contractor, vendor, and state highway agency testing used in the acceptance decision shall be performed by qualified laboratories." The regulation includes laboratories that perform Independent Assurance sampling and testing, as well as dispute resolution sampling and testing. The Idaho Transportation Department (ITD), with approval from FHWA, is responsible for verifying that laboratory operations are performed in accordance with federal and state regulations for the testing of materials incorporated into highway construction projects.

This chapter of the Materials Manual gives the policies and standard operating procedures that shall be followed for state or non-state testing laboratories. In the event there appears to be a conflict between the statements in this section and the current standard specifications, the standard specifications shall prevail.

SECTION 301.00 – LABORATORY FACILITIES

Each laboratory shall maintain facilities (fixed or mobile) for proper control of the laboratory environment. The laboratory must demonstrate its physical ability to provide an appropriate environment in which to test materials. General requirements include that the facility shall be physically able to function as a laboratory (e.g., adequate power, water, lighting, floor space, etc.) and have the capability of maintaining temperatures that are specified in the test methods.

Each laboratory shall maintain facilities for proper storage, handling, and conditioning of test specimens and samples. The laboratory must demonstrate its physical ability to store samples and keep them organized. The laboratory shall maintain separate areas on its premises to store samples and splits of samples in an organized manner so that samples are not lost or discarded and may be found at a future date. In addition, the laboratory shall have facilities for the conditioning of samples as required by any test method.

Each laboratory shall maintain necessary calibration equipment and reference standards. A laboratory shall have, on hand, calibration and verification equipment necessary to ensure the accuracy of its equipment. Such equipment could include calibration weights for scales or balances, manometers for the verification of vacuum pumps, thermometers, etc. This requirement is waived for test equipment that is calibrated or verified by a commercial calibration service.

Each laboratory shall maintain equipment conforming to specification requirements necessary for the testing performed. This is to ensure the laboratory's testing equipment conforms to the specifications listed in the test methods for which the laboratory is qualified. Calibration/ verification must be performed at least once each twelve months, or as specified by AASHTO R 18, for all testing equipment. A commercial calibration service may perform this work. Documentation of current calibration/verification shall be kept in the laboratory. This is to include test equipment name, model, serial no. (if applicable), calibration/verification date, results of calibration/verification, and calibration/verification procedure reference and the name of the person or company who did the calibration/verification (see AASHTO R18).

301.01 Testing Performed by an ITD Laboratory for Government Agencies. Laboratorytesting, field testing, or inspection service is occasionally performed for another government agency. A government agency is defined as a federal, county, city, school district, or state agency.

Testing fees are sometimes waived, however, ITD will determine on an individual basis whether testing fees will be collected.

301.02 Testing and Inspection Performed by ITD Personnel for the Public. The ITD testing
facilities are not public service laboratories. ITD cannot perform any testing or inspection services for the general public or for a commercial firm or contractor unless the material is related to a highway project or research project.

301.03 ITD Central Laboratory. The first formal testing of materials for Idaho highways took place at the University of Idaho in Moscow, Idaho in 1919. Later, as the need expanded, a small laboratory was set up in the basement of the Capitol Building in Boise in 1926. This laboratory operated until 1939 when a Central Laboratory building was built at 27th and Main Streets in Boise. In 1971 the Central Laboratory moved to the present location at 3293 Jordan Street in Boise.

The ITD Central Laboratory is comprised of separate laboratory units that perform specific laboratory tests. Refer to each section for a description of the laboratory unit and its function as follows:

- Aggregate-Asphalt Mix Section — Section 310.00
- Soils Laboratory — Section 320.00
- Soils Mechanics Laboratory — Section 330.00
- Chemistry Laboratory — Section 340.00
- Asphalt Laboratory — Section 350.00
- Structures Laboratory — Section 360.00

The purpose of the Central Laboratory is to provide testing and technical support to the ITD Division of Highways. This is accomplished through materials research and testing of products and specialized testing of construction materials for highway projects that cannot be performed in the district laboratory facilities. The Central Laboratory also performs dispute resolution testing. Each laboratory unit of the Central Laboratory is AASHTO (American Association of State Highway and Transportation Officials) accredited.

The mailing address for the Central Laboratory is:

Materials Section
Idaho Transportation Department
3293 Jordan Street
Boise ID 83702-2151

301.04 ITD District Laboratories and Field Testing Facilities. Testing laboratories are located in each of ITD's districts, namely:

- District 1 – Coeur d'Alene
- District 2 – Lewiston
- District 3 – Boise
- District 4 – Shoshone
- District 5 – Pocatello
- District 6 – Rigby

These district laboratories may perform:

- Acceptance testing
- Preliminary investigation testing
- Independent Assurance testing

Contractual requirements will specify the testing to be performed by ITD laboratories.

Within each district there are portable field testing trailers where on-site project acceptance testing is performed for materials such as, aggregate, asphalt, and concrete.

All of the district testing facilities must be qualified annually through the ITD Laboratory Qualification Program.

301.05 Independent Laboratories or Qualified Laboratories. A qualified laboratory is a laboratory used for sampling and testing of materials that has been qualified through appropriate programs as determined by ITD. An independent laboratory is a laboratory that is not owned or controlled by the contractor or ITD, which is qualified.

ITD specifications require a qualified and/or independent laboratory when the contractor is responsible for the sampling and testing of project materials. The non-ITD laboratories may be permanent facilities or a trailer or building temporarily located at a project site.

SECTION 302.00 – MATERIALS SAMPLES AND TEST REPORTS

All laboratories shall have policies and procedures in place to ensure that its personnel and technical staff have the ability to select, identify, handle, condition, store, and retain test samples; to ensure facilitation of timely and accurate recording of data and test reports; and to ensure the timely delivery of test reports in an acceptable format to ITD.

All samples received at ITD Central Laboratory or an ITD District Laboratory for testing **must be accompanied by a completed Sample Data form.** The ITD -1044 is used for all materials. The exceptions are as follows:

- Performance graded binder, use form ITD -859
- Used lube oil samples, use form ITD -945
- All other asphalts, use form ITD -1045

It is important to complete the Sample Data form as thoroughly as possible. Many delays can be avoided when complete information is included on the form. Noting the following is crucial to accurate reporting:

- Key number
- Project number
- Work authority number
- Sample identification number
- Sample description
- Specification name for the test method
- All other sample information as indicated on the form, depending on the type of material, must be included for the report to be complete

At the time of receiving, the laboratory section supervisor checks the information on the Sample Data form for accuracy and makes necessary corrections or obtains additional information to complete the form by contacting the section submitting the material. In the unit, the sample is given a laboratory number and recorded in the log book.

At the completion of the testing, a test report will be published and distributed as explained herein. If the test report indicates the material is subject to rejection, there must be action taken to remedy the situation. The Standard Specifications, Subsection 105.03, provides that the material may be:

- Accepted
- Accepted with a price adjustment
- Removed

302.01 Sample Identification. ITD samples are identified by numbers followed by a letter to indicate the scope and use of the test results. Some test results are used as acceptance and some are for information only. The identification numbers signify specific materials and the letter signifies the type of test results.

- Sample Identification Numbers

Soils	1 – 099
Quarry, Pit Run, and Crushed Gravel	101 – 199
Concrete Aggregates	201 – 299

Cement	301 – 399
Steel	401 – 499
Culvert Pipe	501 – 599
Road Mix and Plant Mix (from hot plant, roadway, etc.)	601 – 699
Joint Filler	701 – 799
Filler	801 – 899
Miscellaneous	901 – 950
Fly Ash	0951 – 999
Concrete Cylinders (see below)	1001 – 1999
Asphalt, Performance Graded Binder	2001 – 2999*

*Use ITD-1045 for emulsified asphalts and ITD-859 for Performance Graded Binder.

Concrete cylinders, other than 28-day breaks, are to be marked CX, Information Only, unless otherwise specified.

Class (in MPa)	Class (in 100 psi)	ID Number
20.5 or lower	30 or lower	1001-1099
24.0	35	1101-1199
27.5	40	1201-1299
27.5A	40A	1301-1399
27.5B	40B	14011499
27.5C	40C	1501-1599
31.0	45	16001-16999
		These numbers allow for additional cylinder numbers .for PCC pavement.
34.5	50	1701-1750
38.0	55	1751-1799
41.5	60	1801-1850
SEAL	SEAL	1851-1899
SP*	SP*	1901-1950
SP*	SP*	1951-1999

*Use this class for concrete over 40 MPa (6,000 psi) or any class other than those listed.

Examples: 1. SP-38 = 38 MPa
2. SP-48 = 48 MPa

Concrete cylinders will be marked as follows:

28-day tests	A, B & C
7-day tests	D & E
Any additional tests	F, G, H, I, etc.

Do not use numbers past 2000.

- Control Samples (C)

  Control samples are indicated by the letter "C." These samples are tested for acceptance on a project and the test results are either acceptable or subject to rejection. The test results will be published on white-, buff-, or pink-colored paper. White indicates "in specification" material, whereas buff signifies near-border (NB), and pink signifies the material is outside the allowable tolerances and is "Subject to Rejection."

- Information Only Samples (CX)

  Samples indicated by the letters "CX" are tested for "Information Only." The material may be project related or product related. The test results will always be published on white paper, whether the test results indicate the material meets or fails specifications. The near-border arrow (NB→) will indicate out-of-specification test results and the test report will be stamped "Information Only."

- Check Samples (CK)

  If the control samples' test results indicate out-of-specification material, it is possible, with the unit supervisor's concurrence, to change the control sample (C) to a check sample (CK) (for information only) and have another sample tested for verification or retest. The check sample must be from the same lot or batch as the original sample. The check samples are treated the same as control samples for publication.

- Preliminary Engineering Samples (PE)

  Some samples are taken for investigative reasons during project development. These samples are known as "PE" samples, for preliminary engineering. The test results are for information only and are always printed on white paper.

- Qualification Samples (QUAL)

  These samples are submitted for qualification testing to be placed on an ITD-approved products list.

SECTION 303.00 – LABORATORY TEST REPORTS

Test results must be published in a format that will provide all the necessary information to satisfy project contractual requirements. When a sample is tested for a specific ITD project, the project identification, sample identification, and quantity of material represented must appear with the test results on each test report. It is important that every sample tested have the test results published and made available to ITD for acceptance of the material.

- Checking Mathematical Computation on Laboratory Reports

  All original computations are initialed by the person who performed them.

  The Supervisor (ITD or independent laboratory) will be responsible for thoroughly checking the calculations before submitting the laboratory reports. Reports will be initialed by the "checker." If errors are found prior to publishing the test report, the test report will be returned to the originator for correcting and then rechecked. If the error is found after the test report has been published and distributed, then the procedure for correcting test reports must be followed.

  The Quality Assurance Engineer or the District Materials Engineer will periodically review the calculations for laboratory test reports.

- Correcting Test Reports

  When correcting laboratory test reports, do not make any changes on the original test report. First, make a legible copy of the original and then make the changes on the copy. A new date mailed will be used on the corrected report. The new date will be placed below or to the right of the old date. Also indicate what was corrected by placing an arrow pointing to the correction. When a laboratory number is changed, note in the remarks on the test report the number that was changed.

  These same directions apply to making corrections to previously published test reports. Do not make any changes on the original laboratory report. The corrections must be made on a copy of the original report and the corrected copy is published as a separate test report.

- Distribution of Laboratory Test Reports

  In all cases, the original laboratory test report will be retained at the laboratory that performed the testing.

  The ITD Central Laboratory and each District Laboratory will maintain the test reports in a numerical file for each year and also in the project files.

Independent laboratories or contractor's laboratories must provide copies of all test results when performing testing of materials that will be used or may be used for ITD projects. These laboratories may not provide only selected test results and will be required to verify quality control procedures that guarantee accurate testing.

- ITD District Laboratory Test Reports

  District Laboratory reports will be distributed in the district only, unless Central Materials specifically requests a copy. The exception to this policy is the Independent Assurance Reports. One copy will be distributed to the Independent Assurance Coordinator at Central Materials.

- ITD Central Laboratory Test Reports

  Timely distribution of the Central Laboratory reports to the districts is critical. The districts will receive a copy for the District Materials Section and another copy for the District Resident/Regional Engineer/Maintenance, as indicated on the test report.

All other distribution of each of the Central Laboratory reports is according to the distribution list in the Materials Section office.

SECTION 304.00 – TESTING REQUIREMENTS FOR AGGREGATE MATERIAL SOURCES

The aggregate material in a source is evaluated for quality according to The Standard Specifications, Subsection 703. The specifications for contractor-furnished sources provide that all costs will be borne by the contractor. Independent laboratories performing the testing will perform the same tests as would be conducted for ITD's own evaluation. The District Materials Engineer will determine if any specified testing may be unnecessary for specific aggregate items.

Refer to the Materials Manual, Section 270.13 – Aggregate Material Sources, and the Contract Administration Manual, Section 106.09 – Material Sources, for additional information about material sources.

SECTION 305.00 – TEST METHODS AND TEST MANUALS

The Standard Specifications designate the test methods, such as AASHTO, ASTM, WAQTC, IDAHO, etc. These test methods, some of which are copyrighted, are published by the respective agencies. Testing laboratories are required to have the current versions of the test methods when performing sampling and testing. The ITD Central Materials Section distributes an AASHTO test method manual to each District Residency and District Materials Laboratory whenever new versions are published. These manuals also contain a number of ASTM methods designated by ITD specifications.

The Central Materials Section of ITD is responsible for publishing and distributing the current versions of test methods unique to ITD, which are designated as Idaho Test Methods in the Standard Specifications. These Idaho methods are assembled into manuals, as indicated in Section 305.01. Revisions to the material in ITD manuals are made when necessary and reprints distributed. The publication or revision date month/year is indicated in the bottom margin.

305.01 ITD Manuals.

Laboratory III Manual: Contains all current Idaho Test Methods.

Field Test Manual: Divided into two sections.

- Part I: Sampling and Testing Methods

  Contains only Idaho Test Methods used to test materials at the project site.

- Part II: Quality Assurance Program

  Contains policies and standard procedures for acceptance of materials. Contains minimum testing requirements for materials used in highway construction.

SECTION 306.00 – LABORATORY ACCREDITATION

This program was developed under the guidelines of the laboratory qualification program of the Western Alliance for Quality Transportation Construction (WAQTC) and *23 CFR Part 637 – Construction Inspection and Approval*. The program recognizes three categories of laboratories that will test materials for ITD construction projects:

1. Quality Control
2. Quality Assurance
3. Dispute Resolution

306.01 Program Qualification. To ensure that laboratories consistently provide quality test results, they shall be qualified according to this program. As used in this program, the term "laboratory" means an individual test facility. A trailer or building temporarily located at a project site to test materials for ITD projects is a laboratory and must be individually qualified under the program.

The program description separates the inspection duties of ITD Central Laboratory personnel and district personnel. The district personnel will be selected by the District Materials Engineer and approved by the District Engineer for inspection duties of this program.

306.02 Program Description.

Section 1.00 – Quality Control Laboratories: Quality control of construction materials is the responsibility of the contractor and is performed during the production of the material and/or at the point of delivery. Laboratories performing quality control testing may be the contractor's own, a material or product supplier's laboratory, or an independent testing laboratory. When properly verified by Quality Assurance testing, quality control test results may be used for acceptance of material.

Section 1.01 – Quality Control Laboratory Requirements: ITD District Materials Engineers or their approved representatives will inspect Quality Control Laboratories for those test methods necessary to perform Quality Control tests that will eventually be used for the acceptance of material for ITD construction projects.

If the laboratory's equipment is properly calibrated and within specifications, and if the laboratory meets all other conditions specified in the program, ITD will issue the laboratory a certificate of qualification to test materials for ITD construction projects. AASHTO accreditation may be accepted. However, the annual ITD review process will still be required. This certificate will be valid for one year. If a laboratory's certificate expires and the laboratory has a continued need to test materials for ITD construction projects, the laboratory shall apply for re-inspection. To continue testing for ITD projects, the laboratory must meet all the conditions specified in the program and receive a new certificate.

If a Quality Control Laboratory is located in another state, qualification under the program of that state's transportation department, or AASHTO accreditation, may be accepted. Such a laboratory shall furnish evidence of current qualified status for the applicable testing. Examples of laboratories in this category are quality control laboratories in steel fabrication plants, concrete precast plants, aggregate production plants, asphalt terminals, and manufacturing plants, if located outside of Idaho. ITD Central Laboratory personnel will be available to assist in qualifying out-of-state laboratories.

Section 2.00 – Quality Assurance Laboratories: Quality assurance is the responsibility of ITD (the owner). It is planned and systematic actions that provide confidence the quality control and quality assurance results are reliable. Quality Assurance Laboratories generally perform Independent Assurance (IA) and/or Verification tests for ITD construction projects. The Quality Control and Quality Assurance test results are compared to each other to determine the suitability of Quality Control test results for use in the acceptance decision. For some items, however, the acceptance program may require the acceptance decision to be made solely on the basis of testing done by the Quality Assurance Laboratory.

Quality Assurance Laboratories will usually be ITD District or Field Laboratories, but may also be the ITD Central Laboratory, a local Highway District Laboratory, or an ITD contracted independent testing laboratory. No laboratory may perform both Quality Control and Quality Assurance testing for the same construction project.

Any laboratory performing Independent Assurance sampling and testing must be AASHTO accredited for the test methods it performs.

Section 2.01 – Quality Assurance Laboratory Requirements: The ITD Central Laboratory will be responsible for inspections of ITD District Laboratories and local Highway District Laboratories for those test methods necessary to perform Quality Assurance tests of construction materials for ITD construction projects. ITD District Materials Engineers or their approved representatives will inspect ITD field laboratories and independent testing laboratories located in Idaho.

The designated ITD representatives will examine the laboratory's testing equipment for accuracy and conformance to specification. If the laboratory's equipment is properly calibrated and within specifications, and if the laboratory meets all other conditions specified in the program, ITD will issue the laboratory a certificate of qualification to test materials for ITD construction projects. AASHTO accreditation may be accepted. However, the annual ITD review process will still be required. This certificate will be valid for one year. If a laboratory's certificate expires and the laboratory has a continued need to test materials for ITD construction projects, the laboratory shall apply for re-inspection. To continue testing for ITD projects, the laboratory must meet all the conditions specified in the program and receive a new certificate.

If a Quality Assurance Laboratory is located in another state, qualification under the program of that state's transportation department, or AASHTO accreditation, may be accepted. Such a laboratory shall furnish evidence of current qualified status for the applicable testing. Examples of laboratories in this category would be transportation department laboratories of other states, or independent laboratories contracted by ITD for QA services in steel bridge fabrication shops, concrete precast plants, or other manufacturing plants. ITD Central Laboratory personnel will normally handle qualification of out-of-state QA laboratories, unless there is close proximity of the laboratory to District Inspectors.

Section 3.00 – Dispute Resolution Laboratories: When Quality Control and Quality Assurance test results conflict and the conflict cannot be resolved, a neutral Dispute Resolution Laboratory will test the material in question. The test results of the Dispute Resolution Laboratory will decide the dispute.

The ITD Central Laboratory will perform all dispute resolutions unless a potential for conflict of interest exists or the contractor requests an independent laboratory.

Section 3.01 – Dispute Resolution Laboratory Requirements: When the ITD Central Laboratory does not act as the Dispute Resolution Laboratory, selection of a laboratory to perform this function shall be by mutual agreement between ITD and the contractor. In such an event, the laboratory selected shall be AASHTO accredited for the test methods in dispute if accreditation is offered by AASHTO for those methods. If AASHTO does not offer accreditation for the test methods in dispute, then other measures of proficiency shall be reviewed. These might include other accreditation programs and/or participation in cooperative testing programs, for example.

Section 3.02 – Authority of Dispute Resolution Laboratory: The test report(s) of the Dispute Resolutions Laboratory performing dispute resolution materials testing will be considered the final actual test results, replacing the disputed testing for project use.

Section 4.00 – Materials Testing Technician Requirements: Materials testing technicians that test materials for ITD construction projects shall be WAQTC qualified for all tests they perform. For tests not covered by WAQTC, qualification to the appropriate recognized standard is required. An example would be nondestructive testing related to welding inspection, which would be covered by qualification programs of the American Welding Society (AWS) and American Society for Nondestructive Testing (ASNT).

Section 5.00 – Testing Equipment: Equipment used to test materials for ITD construction projects shall be periodically inspected and calibrated as required in the program. Independent Assurance tests will also be utilized as periodic checks of the equipment. Documentation of such inspection and calibration shall be made available upon request. Equipment shall not be used if current documentation is not available. Inspection shall be done by personnel qualified under WAQTC training. Calibration shall be done by WAQTC-qualified personnel or by a commercial calibration service. Measuring equipment used in equipment calibration shall be checked annually using NIST-traceable standards.

Section 6.00 – Conflict of Interest: In order to avoid an appearance of a conflict of interest, any qualified ITD or non-State laboratory shall perform **only one** of the following types of testing on the same project.

- Verification testing
- Quality control testing
- IA testing
- Dispute resolution testing

Section 7.00 – Laboratory Disqualification: A Quality Control or Quality Assurance Laboratory may be disqualified entirely or for specific test methods if it is found not to conform to the specifications and standards of its qualification. A laboratory that has had its qualification revoked for a specific test method(s) may not test materials that require the use of such revoked test method(s). A laboratory that has had its entire qualification revoked shall promptly cease testing materials for ITD construction projects. A laboratory that has had its qualification partially or entirely revoked may seek reinstatement by demonstrating conformance to ITD qualification criteria and by meeting the conditions of the program. The laboratory must receive a new qualification certificate prior to performing any testing for ITD projects.

Section 8.00 – Access: Laboratory facilities and records applicable to ITD projects shall be accessible to both ITD and contractor personnel, or their representatives, having QC, QA, or IA responsibility. FHWA or their representatives shall be granted the same access.

Section 9.00 – Reporting of Test Data: All testing is to be reported, including test results and the quantity of material represented by the test. Test data, which is judged to be invalid or inapplicable, shall be accompanied by an explanation, including reference to the data that replaces the suspect data. Documentation shall include a brief discussion of corrective measures used in obtaining the substitute data.

SECTION 310.00 – AGGREGATE-ASPHALT MIX SECTION

The purpose of the Aggregate-Asphalt Mix Section is to furnish, using approved testing procedures, consistent and reliable information by which aggregate and asphalt mix materials can be evaluated for suitability for use as highway construction materials and for compliance to design specifications.

All materials received shall be tested in accordance with specifications of the awarded contract for each project. If no contract has been awarded, testing will be performed according to the requirements of the ITD Standard Specifications for Highway Construction. (The Aggregate-Asphalt Mix Section is required and does hold accreditation by AASHTO.)

310.01 Referenced Documents.

State of Idaho Contract and Plans (per project)

Idaho Transportation Department Standard Specifications For Highway Construction

AASHTO Standard Specifications for Transportation Materials and Methods of Sampling and Testing (Parts 1 and 2)

ASTM Standards

Western Alliance for Quality Transportation Construction (WAQTC) sampling, testing and inspection manual(s)

Idaho Transportation Department Laboratory Manual Part III

310.02 Aggregate Laboratory. The Aggregate Laboratory is responsible for the quality analysis of aggregates submitted for use in state of Idaho highway projects. Aggregates submitted are primarily tested for the following:

- Quality
- Job Mix Formula confirmation
- Establishing the need and quantity, if any, for anti-stripping additive for asphalt used in mix designs (Immersion Compression)
- Establishing the compaction target for aggregate base and granular borrow
- The strength of compacted base and granular borrow materials (R-Value)

310.02.01 Testing Requirements.

Sample Preparation: Sieving, splitting, and makeup.

Aggregate Quality: Sieve Analysis, L. A. Wear, Idaho Degradation, Sand Equivalent, Ethylene Glycol and, when requested, Soundness of Aggregate.

Job Mix Formula Confirmation and Immersion Compression (Aggregate Portion): Sieve Analysis, Fracture Count, Sand Equivalent, Uncompacted Voids in Fine Aggregate, and specific Gravity of Coarse and Fine Aggregate.

Compaction: Vibratory Compaction, Standard Compaction (Moisture Density), Sieve Analysis, Specific Gravity and Sand Equivalent, and surface area.

Strength of Compacted Base and Granular Borrow: R-Value, Sieve Analysis, Specific Gravity, and Sand Equivalent.

Miscellaneous Testing: Cleanness of Cover Coat Aggregate and Loose Unit Weight.

310.02.02 Test Methods.

WAQTC TM 1	Determining the Percentage of Fracture in Coarse Aggregate
AASHTO T 11	Materials Finer Than 75 µm (No. 200) Sieve in Mineral Aggregates by washing
AASHTO T 19	Unit Weight and Voids in Aggregate
AASHTO T 27	Sieve Analysis of Fine and Coarse Aggregates
AASHTO T 84	Specific Gravity and Absorption of Fine Aggregate
AASHTO T 85	Specific Gravity and Absorption of Coarse Aggregate

AASHTO T 88	Particle Size Analysis of Soils
AASHTO T 96	Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
AASHTO T 100	Specific Gravity of Soils
AASHTO T 104	Soundness of Aggregate by Use of Sodium Sulfate or Magnesium Sulfate
AASHTO T 176	Plastic fines in Graded Aggregates and Soils by Use of the Sand Equivalent Test
AASHTO T 180	Moisture-Density Relations of Soils Using a 4.55 kg (10-lb.) Rammer and a 457 mm (18-in.) Drop
AASHTO T 247	Preparation of Bituminous Mixtures by Means of California Kneading Compactor (Section 3.0, Test Specimens)
AASHTO T 248	Reducing Samples of Aggregate to Testing Size
AASHTO T 304	Uncompacted Void Content of Fine Aggregate
ASTM D 1075	Standard Test Method for Effect of Water on Compressive Strength of Compacted Bituminous Mixtures (Section 5.0, Test Specimens)
IDAHO T-8	Compaction of Soils and Soil Mixtures for the Expansion Pressure and Hveem Stabilometer Tests
IDAHO T-15	Idaho Degradation
IDAHO T-72	Cleanness of Cover Coat Material
IDAHO T-74	Vibratory Spring-Load Compaction for Coarse Granular Material

310.03 Asphalt Mix Laboratory. The Asphalt Mix Laboratory is responsible for the quality analysis of bituminous mixtures submitted for use in state of Idaho highway projects. Materials are primarily tested for:

- Job Mix Formula confirmation.
- Establishing the need and quantity, if any, for anti-stripping additive for asphalt used in mix designs (Immersion Compression).
- Compliance of asphalt mix to specification(s). (Current production.)
- Investigating mix properties of previously produced and placed asphalt mix. (From the existing roadway.)

310.03.01 Testing Requirements.

Sample Preparation: Heating, mixing, and splitting.

Plant Mix and Cold Mix Testing and Immersion Compression: Hveem Stability, Maximum Specific Gravity (Rices Method), Bulk Specific Gravity, Density, Voids in Mineral Aggregate, Mix Air Voids, Effective Asphalt Content, Asphalt Film Thickness, Stripping and Centrifuge Kerosene Equivalent, and Effects of Moisture.

Plant Mix Produced at the Job Site and Cores Extracted from the Roadway: Asphalt Content, Sieve Analysis, Maximum Specific Gravity (Rices Method), Bulk Specific Gravity, Mix Air Voids Density, and Hveem Stability.

310.03.02 Test Methods.

AASHTO T 30	Mechanical Analysis of Extracted Aggregate
AASHTO T 165	Effect of Water on Cohesion of Compacted Bituminous Mixtures
AASHTO T 166	Bulk Specific Gravity of Compacted Bituminous Mixtures Using Saturated Surface-Dry Specimens
AASHTO T 167	Compressive Strength Bituminous Mixtures
AASHTO T 182	Coating and Stripping of Bitumen-Aggregate Mixtures
AASHTO T 209	Theoretical Maximum Specific Gravity and Density of Bituminous Paving Mixtures
AASHTO T 246	Resistance to deformation and Cohesion of Bituminous Mixtures by Means of Hveem Apparatus
AASHTO T 247	Preparation of Test Specimens of Bituminous Mixtures by Means of California Kneading Compactor
AASHTO T 248	Reducing Samples of Aggregate to Testing Size
AASHTO T 269	Percent Air Voids in Compacted Dense and Open Bituminous Paving Mixtures
AASHTO T 270	Centrifuge Kerosene Equivalent and Approximate Bitumen Ratio
AASHTO T 283	Resistance of Compacted Bituminous Mixture to Moisture Induced Damage
AASHTO TP 53	Standard Test Method for Determining the Asphalt Content of Hot Mix Asphalt (HMA) by the Ignition Method
AASHTO TP 4	Density of Hot Mix Asphalt (HMA) Specimens by SHRP Gyratory Compactor

310.04 Job Mix Formula (JMF) Confirmation Process. The district will submit to the Central Laboratory a copy of the source approval letter issued, approving the contractor's selected source(s). The confirmation process will not begin until the source approval letter is received by the Central Laboratory.

Split samples of aggregate (each stockpile individually) and asphalt along with a proposed job mix formula shall be submitted by the prime contractor or his representative to the Aggregate-Asphalt Mix Section for design confirmation. The design will have been prepared and tested by a qualified independent laboratory. Designs that do not meet ITD project requirements and specifications will not be accepted.

ITD will perform a sieve analysis on each individual stockpile. The results will be compared to the independent laboratory design report to verify that we have received comparable stockpile aggregate. If the analysis is the same as the independent laboratory, then comparative testing will commence. If the analysis is significantly different than the independent laboratory (see Section 310.05, Tolerances), the Resident/Regional Engineer, District Materials Engineer, Pavement Engineer, and Construction Associate shall be notified. Contact with the independent laboratory should be made to advise them of the discrepancy. Both testing labs should check their work to ensure that errors were not made testing, computing, or reporting.

Once the sieve analysis is comparable, test specimens are made up using the independent laboratory's make-up weights. When all testing has been completed, the two JMF designs (one from the independent laboratory and the other from ITD) are compared. The contractor's design will either be accepted for use or rejected and a new or adjusted JMF required.

Written notice of acceptance or rejection will be faxed and e-mailed to the Resident/ Regional Engineer by the Aggregate-Asphalt Mix Section. The section will send a copy of the notification to the District Engineer, District Materials Engineer, Construction Engineer, and Pavement Engineer and place a copy in the file. From the date of receiving the aggregate, asphalt, and design at the Aggregate-Asphalt Mix Section, no more than 14 days shall elapse. If, due to lack of confirmation, new testing is required, the 14 days will start over for any new JMF or correction submitted.

310.05 Tolerances.

Target Gradation: Before mix testing can begin the target gradation of the aggregate split received by ITD shall not disagree on any individual screen with the target gradation submitted by the contractor more than the tolerances shown below. The difference(s) in gradation shall not cause a change of more than 0.6 m^2/kg (3.0 $ft^2/lb.$) ± in the total surface area.

Sieve Size	Tolerance, % (±)
25 mm (1 in)	3.0
19 mm (3/4 in)	3.0
12.5 mm (1/2 in)	3.0
9.5 mm (3/8 in)	3.0
4.75 mm (No. 4)	3.0
2.36 mm (No. 8)	3.0
1.18 mm (No. 16)	2.0
600 µ (No. 30)	2.0
300 µ (No. 50)	2.0
150 µ (No. 100)	2.0
75 µ (No. 200)	1.0

Hveem Stability: The stability on the contractor's job mix formula test report must equal or exceed specified stability at the job mix asphalt content. If ITD confirmation tests at the job mix asphalt content yield stability that also equals or exceeds specified stability, then the contractor's stability results are confirmed. If ITD confirmation test results are below specified stability, then the contractor's stability results are considered to be confirmed only if the contractor and the ITD stabilities (each recorded to the nearest integer) do not differ by more than six (6) stability points and if the average of the two (rounded to the nearest integer) is not less than the specified stability.

Mix Air Voids: The contractor's design air void(s) must meet ITD air void specifications of 3.0% to 5.0%. If the contractor's design results and ITD's results disagree no more than 1.5% and ITD's results do not fall beyond the specification limits of 3.0% to 5.0% by more than 0.5%, the two design air voids are considered comparable and the contractor's air void(s) is confirmed.

Voids Mineral Aggregate (VMA): If the contractor's VMA meets the minimum specification and ITD's VMA falls below the minimum specification by no more than 1.5%, the contractor's VMA is confirmed.

Asphalt Film Thickness (AFT): The contractor's design shall have a minimum of 6 microns. If ITD's AFT falls below the specification of 6 microns minimum, the confirmation will be based solely on the judgment of ITD.

Index of Retained Strength (IRS) and Immersion Compression: The contractor shall submit a job mix formula that provides a minimum result of 85% IRS. If ITD's results fall below the minimum of 85%, confirmation will be based solely on the judgment of ITD. Past source file data, if any, should be utilized to make this judgment.

Maximum Theoretical Density: The difference between any two labs cannot exceed 32 kg/m^3 (2.0 pcf). This difference is independent of and does not supersede the air void specification and confirmation tolerance.

Unit Weight of Mix, Compacted: The difference between any two labs cannot exceed 32 kg/m^3 (2.0 pcf). This difference is independent of and does not supersede the air void specification and confirmation tolerance.

310.06 Inspection and Equipment Certification of Satellite Laboratories. Once per year, personnel from the Central Laboratory will qualify satellite laboratories located in each of ITD's districts. The District Laboratories must meet the requirements according to the ITD Laboratory Qualification Program.

SECTION 320.00 – SOILS LABORATORY

The Soils Laboratory tests the physical properties of soil samples that are submitted by the districts and/or the Headquarters Materials Section for the design of pavement, embankments, pipes, etc. Test results are also employed for quality control purposes.

The Soils Laboratory also performs tests on soil samples that are not related to project development, such as samples from research projects, from other state agencies, and from American Materials Reference Laboratories (AMRL).

320.01 Receiving of Soils Samples. Bulk soil samples are received from the districts in canvas or plastic bags, accompanied by an ITD-1044 form. This form should contain the necessary information to enter the sample into the Materials Test Sample Log. The project information is verified before it is entered into the log. The ITD-1044 should also list the tests required (see Section 320.03 below). Upon verification and log entry, a Job Order is assigned and an ITD-656 form is started. The top copy is removed and submitted to the Materials Section Secretary.

320.02 Preparation of Soil Samples. The soil sample is prepared according to AASHTO T 87-86, Section 4.1. After the sample is properly dried and the material is reduced to its natural state, a sample is broken out for each individual test.

320.03 Testing of Soils Samples. After the samples have been prepared, moistened, and stabilized (if required), a worksheet is created. As the tests are completed, the information is entered into the Soils database from these worksheets. Calculations are completed and results are ready for plotting (if R-Value or Moisture/Density tests are completed) on the ITD-803. Upon each test's completion, a computer-generated worksheet is printed and used to complete the Final Report on an ITD-803 and ITD-808.

320.04 Soils Tests.

Test	AASHTO or Idaho Designation	Quantity of Soil Needed to Test
Moisture/Density	T 99 T 99 T 180	Method A - 3.63 kg (8 lb.) Method C - 5.45 kg (12 lb.) Method D - 11.35 kg (25 lb.)
Liquid Limit	T 89	100 grams
Plastic Limit	T 90	100 grams
R-Value (Stability)	Idaho T-8	7.26 kg (16 lb.)
Particle Size Analysis	T 88	60 to 110 grams
Specific Gravity (Fine)	T 100	25 to 100 grams
(Coarse)*	T 85	5000 grams
Sand Equivalent (S.E.)*	T 176	1000 grams
Resistivity	T 288	1500 grams
pH	T-289	100 grams
Gradation (Sieve Analysis)	T 27, T 11	+ # 4, entire sample – # 4, 300 to 500 grams

*These tests are performed by the Aggregate Laboratory. The Soils Laboratory Technician will break out the sample according to the test procedure and deliver the sample to the Aggregates Laboratory. Upon completion of testing, the results are returned to the Soils Laboratory Technician.

320.05 Tests for the Aggregate Laboratory. Some of the Aggregate Laboratory tests require an R-Value and a Specific Gravity for fine-grained materials. The Aggregate Laboratory Technicians will break out the samples according to their procedures and deliver the sample to Soils Laboratory. The same procedure to test the samples for Soils Laboratory is utilized; however, no Job Order is created. The test results are logged in the Soils Laboratory database and a copy of the tests results are delivered to the Aggregate Laboratory. The time spent on these tests is recorded on the Aggregates Laboratory Job Order.

320.06 Publishing the Test Results. The Final Report is presented on two forms (ITD-803 and ITD-808). The computer-generated worksheets are attached, along with a copy of the ITD-1044, to the back of the ITD-803. An ITD-656, Job Order, is completed and the pink copy is attached to the last page of the worksheets. The yellow copy is retained in the Soils Laboratory files. The report with all of the worksheets is turned into the Geotechnical Engineer for review, and then submitted to the Materials Engineer for final approval. The report is then published and distributed to the originating district by the Materials Laboratory Secretary.

SECTION 330.00 – SOILS MECHANICS LABORATORY

The Soil Mechanics Laboratory performs tests to determine physical and mechanical properties of soils and rocks and the behavior of soil or rock masses subjected to various types of forces. Undisturbed soil samples or rock cores are submitted to the Soil Mechanics Laboratory from the districts for testing. The Soil Mechanics Laboratory also performs tests on geotextiles. The test results are used by the districts and/or the Headquarters Materials Section to design foundations for structures, retaining walls, embankments, cut slopes, etc.

330.01 Receiving and Logging of Samples. The samples submitted to the laboratory for testing are received, dated, numbered, and logged in the Sample Log database. The Soil Mechanics Technician checks the information on the samples and the ITD-1044 to ensure their accuracy. An ITD-806, Laboratory Test Program, is then filled out with the information from the ITD-1044 and boring logs.

The ITD-806 form along with sample information and boring logs are submitted to the Geotechnical Engineer for review and determination of the tests to be performed.

330.02 Preparation of Samples. Most of the soil samples submitted to the Soil Mechanics Laboratory are undisturbed ring samples, Shelby tubes, or block samples. Some disturbed soil samples are also received by the laboratory. In the case of the latter, these samples are compacted to predetermined field criteria and tested by the same methods as undisturbed samples. Rock cores are normally submitted to the Soil Mechanics Laboratory for strength tests. Geotextile samples are cut to sizes needed for different tests.

330.03 Testing of Samples. The Geotechnical Engineer fills out and returns the ITD-806 form to the Soil Mechanics Laboratory.

All tests listed on the work order form are performed according to the test methods listed in the next section and the instructions of the Geotechnical Engineer.

330.04 Soil Mechanics Tests.

Test Title	Recommended Test Procedures
Consolidation	ASTM D 2435-90, AASHTO T 216-94
Triaxial Compression	ASTM D 4767-88
Direct Shear	AASHTO T 236-92, ASTM D 3080-72
Permeability, Constant Head	ASTM D 2434-68
Permeability, Falling Head	Corps of Engineers
Lime-Treated Soils	Idaho T-105
Particle Size Analysis of Soils	AASHTO T 88-93
Moisture Content	Idaho T-21, AASHTO T 265
Density	In-Laboratory Method
Rock Point Load Test	In-Laboratory Method
Unified Soil Classification	Asphalt Institute Unified Soil Classification, AASHTO M 145

Test Title	Recommended Test Procedures
Moisture Density Relationship	AASHTO T 99-95
Atterberg Limits	AASHTO T 89-96 and T 90-96
Mechanical Analysis of Soil	AASHTO T 88-93
Specific Gravity	AASHTO T 100-95
Trapazoid Tearing Strength of Geotextiles	ASTM D 4533-85
Tensile Properties of Geotextiles	ASTM D 4595-86
By the Wide-Width Strip Method Breaking Load and Elongation of Geotextiles (Grab Method)	ASTM D 4632-86
Index Puncture Resistance of Geotextiles	ASTM D 4833-88

330.05 Publishing Test Results. The results of all tests are summarized on ITD-999, Summary Sheet. Individual test results are recorded on worksheets. As each test progresses and is completed, the results are computed and recorded on the appropriate worksheet. When all of the tests are completed, the results are calculated and entered on the proper master form.
The test result forms are grouped together by test and a master form or a collective test form is filled in with all the final results from the various tests. All the completed test data are submitted to the Geotechnical Engineer for his review and approval. After approval, the report is submitted to the Materials Section Secretary for publication and distribution.

SECTION 340.00 – CHEMISTRY LABORATORY

The Materials Section Chemistry Laboratory's primary responsibility is to provide accurate, reliable, and consistent chemical and physical analyses of a wide variety of highway materials used in the construction and maintenance of the highways. The testing and evaluation of the materials to specifications assures the quality of the products used in ITD. The Chemistry Laboratory conducts analyses and evaluations on submitted samples for award of statewide contract's materials including traffic line paint, glass beads, anti-icing and deicing chemicals, pavement markings, etc.

The Chemistry Laboratory monitors submitted samples of materials for specification compliance in both Quality Control and Quality Assurance Programs. The Chemistry Laboratory is accredited by the American Association for State Highway and Transportation Officials (AASHTO) for cement analysis. The laboratory participates in the sample proficiency programs with the Cement and Concrete Reference Laboratory (CCRL) and the American Materials Reference Laboratory (AMRL) through AASHTO. The Chemistry Laboratory also participates in a monthly proficiency program (MVP) through the Peter Kiewet Engineering Company. The Chemistry Laboratory maintains an internal Quality Control/Quality Assurance program.

The Chemistry Laboratory provides a consultative service for select materials used in ITD projects. The Chemistry Laboratory conducts research on new products and testing procedures. Research results are evaluated for either compliance to existing specifications or for implementation in future specifications. The Chemistry Laboratory also generates new specifications for developing materials.

340.01 Reference Documents.

AASHTO Standard Specifications for Transportation Materials and Methods of Sampling and Testing (Parts 1 and 2).

American Standards of Testing and Materials (ASTM).

Idaho Transportation Department Standard Specifications for Highway Construction.

Special Provisions from ITD contracts (SP).

Standard Special Provisions (SSP).

Steel Structures Painting Council Specifications and Test Methods (SSPC).

United States Federal Specifications and Test Methods (FSTM).

United States Military Specifications and Test Methods (Mil Specs).

Idaho Test Methods.

ITD Field Test Manual Part I, Sampling and Testing Methods (MTRs).

Society of Automotive Engineers Manuals (SAE).

Spectro Inc. Operations Manual for Spectro M Spectrophotometer.

Handbook of Lubrication Engineering, Volume 1.

Idaho Transportation Department Contract and Plans (per project or contract).

Standard Methods for the Examination of Water and Wastewater (SM).

National Association of Corrosion Engineers (NACE).

United States Environmental Protection Agency (EPA).

United States Department of Agriculture (USDA) Agricultural Handbook No. 60, Diagnosis and Improvement of Saline and Alkaline Soils Methods.

340.02 Chemistry Laboratory Functions. ITD's Preventative Maintenance Oil Analysis Program requires the Chemistry Laboratory to monitor state-owned equipment. As a part of this program, the Chemistry Laboratory performs chemical and physical analyses on used lubricating and hydraulic oils. This includes testing, evaluation, and interpretation of the test data to create a historical trend for the particular piece of equipment. The Chemistry Laboratory coordinates with the Maintenance Section's Equipment Specialist to make appropriate recommendations for maintenance of the equipment tied to the historical trend data.

Samples received from a project or contract are tested as routine or complete samples. Complete testing includes a series of tests as outlined in the next section. Routine testing involves a set of two or more tests. If any problem is found with the routine testing results, the material may then be tested according to the guidelines for complete analysis. Routine and complete testing is completed on

materials with continual use throughout the contract year. Testing frequency is determined by the sequence of the samples submitted statewide as control samples. Occasionally the Chemistry Laboratory sends out samples requiring specialized testing procedures.

Sample frequency for construction and maintenance materials is dictated by the ITD MTRs from the Idaho Field Test Manual Part II and/or as documented in ITD contracts. General sample preparation is determined by the individual testing protocol. Testing tolerances for the materials being tested are that the result must be within the specifications listed unless otherwise noted.

340.03 Testing Requirements.

An asterisk (*) denotes a modification in the specified testing procedure.

340.03.01 Antifreeze.

Sample Frequency: As determined in the ITD contract.

Forms:

ITD-1044	Sample Information For Testing
ITD-940(2)	Worksheet For Antifreeze
ITD-940(1)	Report of Tests on Antifreeze

Test Methods:

ASTM D 92	Test Method for Flash and Fire Points by Cleveland Open Cup
ASTM D 1119	Test Method for Ash Content of Engine Coolants and Anti-Rusts
ASTM D 1120	Test Method for Boiling Point of Engine Coolants
ASTM D 1121	Test Method for Reserve Alkalinity of Engine Coolants and Anti-Rusts
ASTM D 1122	Test Method for Specific Gravity of Engine Coolant Concentrates and Engine Coolants by Hydrometer
ASTM D 1177	Test Method for Freezing Point of Aqueous Engine Coolants
ASTM D 1287	Test Method for pH of Engine Coolants and Anti-Rusts
ASTM D 1881	Test Method for Foaming Tendencies of Engine Coolants in Glassware
ASTM D 3306	Specification for Ethylene Glycol Base Engine Coolant for Automobile and Light Duty Service
FSTM O A 548D	Federal Specification for Antifreeze/Coolant, Engine: Ethylene Glycol, Inhibited, Concentrated

Testing of Antifreeze Consists of the Following ASTM and Federal Tests:

ASTM D 1121	Reserve Alkalinity

ASTM D 1287	pH (33% solution)
ASTM D 1287	pH (50% solution)
ASTM D 1287	pH (Undiluted)
ASTM D 1122	Specific Gravity (Undiluted)
ASTM D 1177	Freezing Point (Undiluted)
ASTM D 1120	Boiling Point (Undiluted)
ASTM D 92	Flashpoint
ASTM D 1881	Foaming Test
ASTM D 1119	Ash Content
FSTM O A 548D	Product Compatibility

340.03.02 Portland Cement.

Sample Frequency: According to the Idaho Field Test Manual Part II.

Portland Cement Analysis Structure: The Analysis Structure for cement testing is based on the accumulated sum of metric or English tons of cement, as totaled per bid schedule item of cement (409, 502, etc.) per type of cement (I; III; I, V; etc.) for each cement manufacturer. At 1 metric ton of cement, 1900 metric tons accumulated of cement, 3800 metric tons accumulated of cement, and every 3800 metric tons accumulated thereafter, a complete test will be run on the cement sample. For English tons the accumulation is at 1 ton, 2,100 tons, 4,200 tons, and every 4,200 tons thereafter, a complete test will be run on the cement sample.

For bid schedule item 409 cement samples, the first sample per project will be run as a complete test. Anytime the Manufacturer Mill Analysis number changes on a project, a complete test is performed. Every tenth sample received will be run as a complete test. Follow the Analysis Structure to designate cement sample completes. For bid schedule item 502 samples, if the project is designated by the district to contain less than 2000 m^3 of concrete, the first sample will be run as an alkali test only. If the project is designated by the district to contain more than 2000 m^3 of concrete, the first sample will be run as a complete. If there is no designation by the district as to the amount of concrete being used on the project, the first sample will be run as an alkali test only. When the eighth sample for that project is received, it will be run as a complete. Anytime the Manufacturer's Mill Analysis changes on a project, the sample will be run as an alkali test. Follow the Analysis Structure to designate sample completes. Every time the contract item number for concrete changes on a project, an alkali test will be run. Follow the sequence of testing according to the Analysis Structure thereafter for bid schedule items 409, 502, etc., cement samples.

Forms:

ITD-1044	Sample Information For Testing
ITD-909	Cement Worksheet

ITD-810 Report of Tests on Portland Cement

Test Methods:

AASHTO M 85 Standard Specification for Portland Cement

AASHTO T 105 Chemical Analysis of Hydraulic Cement

AASHTO T 153 Fineness of Portland Cement by Air Permeability Apparatus

Testing of Portland Cement Consists of the Following AASHTO Tests:

AASHTO T 105 Silicon Dioxide

AASHTO T 105 Aluminum Oxide

AASHTO T 105 Ferric Oxide

AASHTO T 105 Calcium Oxide

AASHTO T 105 Magnesium Oxide

AASHTO T 105 Sulfur Trioxide

AASHTO T 105 Loss on Ignition

AASHTO T 105 Insoluble Residue

AASHTO M 85 Tricalcium Silicate

AASHTO M 85 Tricalcium Aluminate

AASHTO T 105 Total Alkali

AASHTO T 153 Blaine Air Permeability

Noncompliant Material and Price Adjustment:

Total Alkali Content (maximum of 0.60%)

Deviation (+), % of spec. value	Price Adjustment
< 0.62	None
> 0.62 and < 0.64	15%
> 0.64	25%

340.03.03 Curing Compound.

Sample Frequency: According to the Idaho Field Test Manual Part II.

Forms:

ITD-1044	Sample Information For Testing
ITD-874	Curing Compound Worksheet
ITD-840	Report of Tests on Curing Compound

Test Methods:

AASHTO M 148	Liquid Membrane-Forming Compounds for Curing Concrete
AASHTO T 155	Water Retention by Concrete Curing Materials
ASTM D 1644*	Test Methods for Nonvolatile Content of Varnishes
ASTM E 1347	Test Method for Color and Color-Difference Measurement by Tristimulus (Filter) Colorimetry
ASTM D 1475	Test Method for Density of Paint, Varnish, Lacquer, and Related Products

Testing of Curing Compounds Consists of the Following AASHTO and ASTM Tests:

AASHTO T 155	Water Retention
AASHTO M 148	Coverage Rate
AASHTO M 148	Rate of Application
ASTM D 1644 *	Nonvolatile Solids
ASTM D 1475	Density
AASHTO M 148	Fugitive Dye
AASHTO M 148	Contains Finely Divided White Pigment
ASTM E 1347	Daylight Reflectance
AASHTO M 148	Dry to Touch

Noncompliant Material and Price Adjustment: Noncompliant material is not accepted. The product is returned to the manufacturer and replaced with acceptable material. Price adjustments are not in place for this material.

340.03.04 Fly Ash.

Sample Frequency: According to the Idaho Field Test Manual Part II.

Forms:

ITD-1044	Sample Information for Testing
ITD-909	Fly Ash Worksheet
ITD-800	Report of Tests on Material

Test Methods:

AASHTO M 295	Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Portland Cement Concrete
ASTM C 311	Test Methods for Sampling and Testing Fly Ash or Natural Pozzolans for use as a Mineral Admixture for Portland Cement Concrete

Testing of Fly Ash Consists of the Following ASTM Tests:

ASTM C 311	Moisture Content
ASTM C 311	Loss on Ignition

Noncompliant Material and Price Adjustment: Noncompliant material is not accepted. Material is returned to the manufacturer and replaced with acceptable material. Price adjustments are not in place for this material.

340.03.05 Latex Modifier.

Sample Frequency: According to the Idaho Field Test Manual Part II.

Forms:

ITD-1044	Sample Information for Testing
ITD-800	Report of Tests on Material

Test Method:

IDAHO T-121	Standard Method of Test for Determining Total Solids-Latex, Percent

Testing of Latex Modifier Consists of the Following Idaho Test:

IDAHO T-121	Total Solids-Latex, Percent

Noncompliant Material and Price Adjustment: Noncompliant material is not accepted. The product is returned to the manufacturer and replaced with an acceptable product. Price adjustments are not in place for this material.

340.03.06 Silica Fume.

Sample Frequency: According to the Idaho Field Test Manual Part II.

Forms:

ITD-1044	Sample Information for Testing
ITD-800	Report of Tests on Material

Test Methods:

AASHTO M 307	Microsilica for Use in Concrete and Mortar
ASTM C 1240	Standard Specification for Silica Fume for Use in Hydraulic-Cement Concrete and Mortar
ASTM C 311	Test Methods for Sampling and Testing Fly Ash or Natural Pozzolans for Use as a Mineral Admixture for Portland Cement Concrete
ASTM C 430	Test Method for Fineness of Hydraulic Cement by the No. 325 Sieve

Testing of Silica Fume Consists of the Following ASTM Tests:

ASTM C 311	Silicon Dioxide
ASTM C 311	Sulfur Trioxide
ASTM C 311	Aluminum Oxide
ASTM C 311	Ferric Oxide
ASTM C 311	Calcium Oxide
ASTM C 311	Sodium Oxide
ASTM C 311	Potassium Oxide
ASTM C 311	Magnesium Oxide
ASTM C 311	Available Alkali
ASTM C 311	Loss on Ignition
ASTM C 311	Moisture
ASTM C 430	Fineness by No. 325 Sieve

Noncompliant Material and Price Adjustment: Noncompliant material is not accepted. The product is returned to the manufacturer and replaced with an acceptable product. Price adjustments are not in place for this material.

340.03.07 Chloride in Concrete.

Sample Frequency: According to the Idaho Field Test Manual Part II.

Forms:

ITD-1044	Sample Information for Testing
ITD-947	Chloride Worksheet for Gran Plots
ITD-847	Report of Tests for Chloride in Hardened Concrete

Test Methods:

IDAHO T-131	Standard Method of Test for Total Chloride Content of Hardened Concrete by Gran Plot Method
AASHTO T 260	Sampling and Testing for Chloride Ion in Concrete and Concrete Raw Materials

Testing of Chloride in Concrete Consists of the Following Idaho Test:

IDAHO T-131	Total Chloride Content in Hardened Concrete

340.03.08 Deicing and Anti-Icing Chemicals.

The following sections give the testing requirements by category.

340.03.08.01 Liquid Chemical Deicer.

Category 1 – Corrosion Inhibited Liquid Magnesium Chloride

Sample Frequency: As determined by ITD contract.

Forms:

ITD-1044	Sample Information for Testing
ITD-917	Liquid Deicer Worksheet
ITD-916	Report of Tests on Liquid Deicer

Test Methods:

PNS and ITD Specifications and Test Methods # 1-10 and A, B, and C

ASTM D 1293	Standard Test Methods for pH of Water
ASTM D 1429	Test Methods for Specific Gravity of Water and Brine
SM 3111A	Metals by Flame Atomic Absorption Spectrometry
SM 3112B	Cold-Vapor Atomic Absorption Spectrometric Method

SM 4500-P	Phosphorus
SM 4500-CN	Cyanide
NACE TM-01-95	Standard Test Method – Laboratory Corrosion Testing of Metals – PNS Modified

Testing of Liquid Deicer Consists of the Following PNS, ASTM, Standard Methods, and NACE Tests:

PNS Method A	Concentration of Active Ingredient in Liquid Deicer
ASTM D 1429	Specific Gravity
PNS Method C	Total Settleable Solids
PNS Method C	Agitation Requirement
PNS Method C	Percent Solids Passing # 10 Sieve
ASTM D 1293	pH (Neat)
ASTM D 1293	pH (1:4 dilution)
PNS Method B	Corrosion Rate
SM 3125B	Arsenic
SM 3125B	Barium
SM 3125B	Cadmium
SM 3125B	Chromium
SM 3125B	Copper
SM 3125B	Lead
SM 3112B	Mercury
SM3125B	Selenium
SM 3125B	Zinc
SM 4500-P	Total Phosphorous
SM 4500-CN	Total Cyanide

Testing Tolerances: Vendor quoted concentration ± 1.0%.

Noncompliant Material and Price Adjustment:

Vender Quoted Concentration (VQC)

Deviation (±), % of spec. value	Price Adjustment
VQC less 1%	None
25.0 – VQC less 1%	35%
24.0 – 24.9%	50%
22.0 – 23.9%	75%
< 21.9%	100%

Total Settleable Solids Not Passing # 10 Sieve (percent by weight)

Deviation (±), % of spec. value	Price Adjustment
> 99.0%	50%

A 50% price adjustment will be taken on material that is not compliant to the General Specifications. The General Specifications include Total Metals, Total Cyanide, and Total Phosphorous and Corrosion Effectiveness. The price adjustments will be based on the materials cost only F.O.B. contractor's price.

Category 2 – Corrosion Inhibited Liquid Calcium Chloride

Sample Frequency: As determined by ITD contract.

Forms:

ITD-1044	Sample Information for Testing
ITD-917	Liquid Deicer Worksheet
ITD-916	Report of Tests on Liquid Deicer

Test Methods:

PNS Method A	Concentration of Active Ingredient in Liquid Deicer
ASTM D 1429	Specific Gravity
PNS Method C	Total Settleable Solids
PNS Method C	Agitation Requirement
PNS Method C	Percent Solids Passing # 10 Sieve
ASTM D 1293	pH (Neat)
ASTM D 1293	pH (1:4 dilution)

PNS Method B	Corrosion Rate
SM 3125B	Arsenic
SM 3125B	Barium
SM 3125B	Cadmium
SM 3125B	Chromium
SM 3125B	Copper
SM 3125B	Lead
SM 3112B	Mercury
SM 3125B	Selenium
SM 3125B	Zinc
SM 4500-P	Total Phosphorous
SM 4500-CN	Total Cyanide

Testing of Liquid Deicer Consists of the Following PNS, ASTM, Standard Methods, and NACE Tests:

PNS Method A	Concentration of Active Ingredient in Liquid Deicer
ASTM D 1429	Specific Gravity
PNS Method C	Total Settleable Solids
PNS Method C	Agitation Requirement
PNS Method C	Percent Solids Passing # 10 Sieve
ASTM D 1293	pH (Neat)
ASTM D 1293	pH (1:4 dilution)
PNS Method B	Corrosion Rate
SM 3125B	Arsenic
SM 3125B	Barium
SM 3125B	Cadmium
SM 3125B	Chromium
SM 3125B	Copper

SM 3125B	Lead
SM 3112B	Mercury
SM 3125B	Selenium
SM 3125B	Zinc
SM 4500-P	Total Phosphorous
SM 4500-CN	Total Cyanide

Noncompliant Material and Price Adjustment:

Vender Quoted Concentration (VQC)

Deviation (±), % of spec. value	Price Adjustment
VQC less 1%	None
25.0 – VQC less 1%	35%
24.0 – 24.9%	50%
22.0 – 23.9%	75%
< 21.9%	100%

Total Settleable Solids Not Passing # 10 Sieve (percent by weight)

Deviation (±), % of spec. value	Price Adjustment
> 99.0%	50%

A 50% price adjustment will be taken on material that is not compliant to the General Specifications. The General Specifications include Total Metals, Total Cyanide, and Total Phosphorous and Corrosion Effectiveness. The price adjustments will be based on the materials cost only F.O.B. contractor's price.

Category 3 – Noncorrosion Inhibited Liquid Calcium Magnesium Acetate

Sample Frequency: As determined by ITD contract.

Forms:

ITD-1044	Sample Information for Testing
ITD-917	Liquid Deicer Worksheet
ITD-916	Report of Tests on Liquid Deicer

Test Methods:

PNS and ITD Specifications and Test Methods # 1-10 and A, B, and C

ASTM D 1293	Standard Test Methods for pH of Water
ASTM D 1429	Test Methods for Specific Gravity of Water and Brine
SM 3111A	Metals by Flame Atomic Absorption Spectrometry
SM 3112B	Cold-Vapor Atomic Absorption Spectrometric Method
SM 4500-P	Phosphorus
SM 4500-CN	Cyanide
NACE TM-01-95	Standard Test Method – Laboratory Corrosion Testing of Metals – PNS Modified

Testing of Liquid Deicer Consists of the Following PNS, ASTM, Standard Methods, and NACE Tests:

PNS Method A	Concentration of Active Ingredient in Liquid Deicer
ASTM D 1429	Specific Gravity
PNS Method C	Total Settleable Solids
PNS Method C	Agitation Requirement
PNS Method C	Percent Solids Passing # 10 Sieve
ASTM D 1293	pH (Neat)
ASTM D 1293	pH (1:4 dilution)
PNS Method B	Corrosion Rate
SM 3125B	Arsenic
SM 3125B	Barium
SM 3125B	Cadmium
SM 3125B	Chromium
SM 3125B	Copper
SM 3125B	Lead
SM 3112B	Mercury
SM 3125B	Selenium
SM 3125B	Zinc

SM 4500-P Total Phosphorous

SM 4500-CN Total Cyanide

Noncompliant Material and Price Adjustment:

Vender Quoted Concentration (VQC)

Deviation (±), % of spec. value	Price Adjustment
VQC less 1%	None
25.0 – VQC less 1%	35%
24.0 – 24.9%	50%
22.0 – 23.9%	75%
< 21.9%	100%

Total Settleable Solids Not Passing # 10 Sieve (percent by weight)

Deviation (±), % of spec. value	Price Adjustment
> 99.0%	50%

A 50% price adjustment will be taken on material that is not compliant to the General Specifications. The General Specifications include Total Metals, Total Cyanide, and Total Phosphorous and Corrosion Effectiveness. The price adjustments will be based on the materials cost only F.O.B. contractor's price.

340.03.08.02 Solid Deicing Chemicals.

Category 4 – Corrosion Inhibited Sodium Chloride

Sample Frequency: As determined by ITD contract.

Forms:

ITD-1044 Sample Information for Testing

ITD-800 Report of Tests on Material

Test Methods:

PNS and ITD Specifications and Test Methods 12, 13, and 14

ASTM E 534 Test Methods for Chemical Analysis of Sodium Chloride

ASTM D 632 Specification for Sodium Chloride

Testing of Solid Deicer Chemicals Consists of the Following ASTM and PNS Tests:

ASTM E 534 Moisture Content of Solid Deicer Products

ASTM D 632 Gradation

PNS Method 14 Visual Inspection

Testing Tolerances: Gradation Type I, Grade 2 Sodium Chloride (per ASTM D 632).

Sieve Size	Wt. % Passing	Permissible Variation	Price Adjustment
3/4"	100	± 5%	None
# 4	20 – 100	± 5%	None
# 8	10 – 0	± 5%	None
# 30	0 – 15	± 5%	None

Noncompliant Material and Price Adjustment: Gradations outside the above limiting tolerances will be assessed a 25% price adjustment.

A 50% price adjustment will be taken on material that is not compliant to the General Specifications. The General Specifications include Total Metals, Total Cyanide, and Total Phosphorous and Corrosion Effectiveness. The price adjustments will be based on the materials cost only F.O.B. contractor's price.

Category 5 – Corrosion Inhibited Sodium Chloride Plus 10% Magnesium Chloride

Sample Frequency: As determined by ITD contract.

Forms:

ITD-1044 Sample Information for Testing

ITD-800 Report of Tests on Material

Test Methods:

PNS and ITD Specifications and Test Methods 12, 13, and 14

ASTM E 534 Test Methods for Chemical Analysis of Sodium Chloride

ASTM D 632 Specification for Sodium Chloride

Testing of Solid Deicer Chemicals Consists of the Following ASTM and PNS Tests:

ASTM E 534 Moisture Content of Solid Deicer Products

ASTM D 632 Gradation

PNS Method 14 Visual Inspection

Testing Tolerances: Gradation Type I, Grade 2 (per ASTM D 632).

Sieve Size	Wt. % Passing	Permissible Variation	Price Adjustment
3/4"	100	± 5%	None
# 4	20 – 100	± 5%	None
# 8	10 – 0	± 5%	None
# 30	0 – 15	± 5%	None

Noncompliant Material and Price Adjustment: Gradations outside the above limiting tolerances will be assessed a 25% price adjustment.

A 50% price adjustment will be taken on material that is not compliant to the General Specifications. The General Specifications include Total Metals, Total Cyanide, and Total Phosphorous and Corrosion Effectiveness. The price adjustments will be based on the materials cost only F.O.B. contractor's price.

Category 6 – Corrosion Inhibited Sodium Chloride Plus 20% Magnesium Chloride

Sample Frequency: As determined by ITD contract.

Forms:

ITD-1044 Sample Information for Testing

ITD-800 Report of Tests on Material

Test Methods:

PNS and ITD Specifications and Test Methods 12, 13, and 14

ASTM E 534 Test Methods for Chemical Analysis of Sodium Chloride

ASTM D 632 Specification for Sodium Chloride

Testing of Solid Deicer Chemicals Consists of the Following ASTM and PNS Tests:

ASTM E 534 Moisture Content of Solid Deicer Products

ASTM D 632 Gradation

PNS Method 14 Visual Inspection

Testing Tolerances: Gradation Type I, Grade 2 (per ASTM D 632).

Sieve Size	Wt. % Passing	Permissible Variation	Price Adjustment
3/4"	100	± 5%	None
# 4	20 – 100	± 5%	None
# 8	10 – 0	± 5%	None
# 30	0 – 15	± 5%	None

Noncompliant Material and Price Adjustment: Gradations outside the above limiting tolerances will be assessed a 25% price adjustment.

A 50% price adjustment will be taken on material that is not compliant to the General Specifications. The General Specifications include Total Metals, Total Cyanide, and Total Phosphorous and Corrosion Effectiveness. The price adjustments will be based on the materials cost only F.O.B. contractor's price.

Category 7 – Solid Calcium Magnesium Acetate

Sample Frequency: As determined by ITD contract.

Forms:

ITD-1044 Sample Information for Testing

ITD-800 Report of Tests on Material

Test Methods:

PNS and ITD Specifications and Test Methods 12, 13, and 14

ASTM E 534 Test Methods for Chemical Analysis of Sodium Chloride

ASTM D 632 Specification for Sodium Chloride

Testing of Solid Deicer Chemicals Consists of the Following ASTM and PNS Tests:

ASTM E 534 Moisture Content of Solid Deicer Products

ASTM D 632 Gradation

PNS Method 14 Visual Inspection

Noncompliant Material and Price Adjustment: A 50% price adjustment will be taken on material that is not compliant to the General Specifications. The General Specifications include Total Metals, Total Cyanide, and Total Phosphorous and Corrosion Effectiveness. The price adjustments will be based on the materials cost only F.O.B. contractor's price.

Category 8 – Noncorrosion Inhibited Sodium Chloride

Sample Frequency: As determined by ITD contract.

Forms:

ITD-1044 Sample Information for Testing

ITD-800 Report of Tests on Material

Test Methods:

PNS and ITD Specifications and Test Methods 12, 13, and 14

ASTM E 534 Test Methods for Chemical Analysis of Sodium Chloride

ASTM D 632 Specification for Sodium Chloride

Testing of Solid Deicer Chemicals Consists of the Following ASTM and PNS Tests:

ASTM E 534 Moisture Content of Solid Deicer Products

ASTM D 632 Gradation

PNS Method 14 Visual Inspection

Testing Tolerances: Gradation Type I, Grade 2 (per ASTM D 632).

Sieve Size	Wt. % Passing	Permissible Variation	Price Adjustment
3/4"	100	± 5%	None
# 4	20 – 100	± 5%	None
# 8	10 – 0	± 5%	None
# 30	0 – 15	± 5%	None

Noncompliant Material and Price Adjustment: Gradations outside the above limiting tolerances will be assessed a 25% price adjustment.

A 50% price adjustment will be taken on material that is not compliant to the General Specifications. The General Specifications include Total Metals, Total Cyanide, and Total Phosphorous and Corrosion Effectiveness. The price adjustments will be based on the materials cost only F.O.B. contractor's price.

340.03.09 Fencing.

Sample Frequency: According to the Idaho Field Test Manual Part II.

Forms:

ITD-1044	Sample Information for Testing
ITD-833	Barbed Wire Worksheet
ITD-836	Report of Tests on Barbed Wire
ITD-833	Chain Link Wire Worksheet
ITD-836	Report of Tests on Chain Link Wire
ITD-833	Woven Wire Worksheet
ITD-836	Report of Tests on Woven Wire
ITD-800	Report of Tests on Material

Test Methods:

IDAHO T-6	Standard Method of Inspecting and Sampling Fencing Materials
AASHTO M 111	Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
AASHTO M 181	Chain-Link Fence
AASHTO M 232	Zinc Coating (Hot-Dip) on Iron and Steel Hardware
AASHTO M 279	Zinc-Coated (Galvanized) Steel Woven Wire Fence Fabric
AASHTO M 280	Zinc-Coated (Galvanized) Steel Barbed Wire
AASHTO M 281	Steel Fence Posts and Assemblies, Hot-Wrought
AASHTO T 65	Mass of Coating of Iron and Steel Articles with Zinc or Zinc-Alloy Coatings
ASTM F 1083	Specification for Pipe, Steel, Hot-Dipped Zinc-Coated (Galvanized) Welded, for Fence Structures
ASTM A 116	Specification for Zinc-coated (Galvanized) Steel Woven Wire Fence Fabric
ASTM A 185	Specification for Steel Welded Wire Fence Fabric, Plain, for Concrete Reinforcement
ASTM E 370	Standard Test Method and Definition for Mechanical Testing of Steel Products
ASTM A 90	Test Method for Weight (Mass) of Coating on Iron and Steel Articles with Zinc or Zinc Alloy Coatings
ASTM F 1083	Specification for Pipe, Steel, Hot Dipped Zinc-Coated (Galvanized) Welded, for Fence Structures

340.03.09.01 Barbed Wire.

Testing of Barbed Wire Consists of the Following AASHTO Tests:

AASHTO M 280	Number of Barbs
AASHTO M 280	Cumulative Spacing of Barbs
AASHTO M 280	Individual Barb Spacing
AASHTO M 280	Diameter of Wire
AASHTO T 65	Mass of Zinc Coating
AASHTO M 280	Breaking Strength

Noncompliant Material and Price Adjustment: Noncompliant material is not accepted. Material is returned to the manufacturer and replaced with acceptable material. Price adjustments are not in place for this material.

340.03.09.02 Chain Link Wire.

Testing of Chain Link Wire Consists of the Following AASHTO Tests:

AASHTO M 181	Size of Mesh
AASHTO M 181	Diameter of Wire
AASHTO M 181	Height
AASHTO T 65	Mass of Zinc Coating
AASHTO M 181	Breaking Strength

Noncompliant Material and Price Adjustment: Noncompliant material is not accepted. Material is returned to the manufacturer and replaced with acceptable material. Price adjustments are not in place for this material.

340.03.09.03 Woven Wire.

Testing of Woven Wire Consists of the Following AASHTO Tests:

AASHTO M 279	Height of Fence Fabric
AASHTO M 279	Size of Wire – Vertical Stay
AASHTO M 279	Size of Wire – Horizontal Line
AASHTO M 279	Diameter of Wire – Top Wire
AASHTO M 279	Diameter of Wire – Horizontal Wire

AASHTO M 279	Diameter of Wire – Vertical Wire
AASHTO M 279	Diameter of Wire – Bottom Wire
AASHTO T 65	Mass of Zinc Coating – Top Wire
AASHTO T 65	Mass of Zinc Coating – Bottom Wire
AASHTO T 65	Mass of Zinc Coating – Horizontal Wire
AASHTO T 65	Mass of Zinc Coating – Vertical Wire
AASHTO M 279	Breaking Strength – Top Wire
AASHTO M 279	Breaking Strength – Bottom Wire
AASHTO M 279	Breaking Strength – Horizontal Wire

Noncompliant Material and Price Adjustment: Noncompliant material is not accepted. Material is returned to the manufacturer and replaced with acceptable material. Price adjustments are not in place for this material.

340.03.09.04 Silt Fence.

Testing of Silt Fence Consists of the Following ASTM Tests:

ASTM A 116	Wire Gage-Upper & Lower
ASTM A 116	Wire Gage-Intermediate
ASTM A 116	Height of Fence Fabric

Noncompliant Material and Price Adjustment: Noncompliant material is not accepted. Material is returned to the manufacturer and replaced with acceptable material. Price adjustments are not in place for this material.

340.03.09.05 Gabion Fence.

Testing of Gabion Fence Consists of the Following ASTM Tests:

ASTM A 185	Wire Gage
ASTM A 185	Width of Fabric
ASTM A 185	Length of Flat Sheets
ASTM A 185	Grid Opening Diagonal Dimension
ASTM A 185	Mesh Grid Pattern and Resistance Welding
ASTM E 370	Tensile Strength

ASTM A 90 Weight of Zinc Coating

Testing of Gabion Fence Tie Wire and Connecting Wire Consists of the Following ASTM Test:

ASTM A 641 Mass of Zinc Coating on Carbon Steel Wire

Noncompliant Material and Price Adjustment: Noncompliant material is not accepted. Material is returned to the manufacturer and replaced with acceptable material. Price adjustments are not in place for this material.

340.03.09.06 Steel Fence Posts and Assemblies for Woven Wire and Barb Wire Fences.

Testing of Steel Fence Posts and Assemblies Consists of the Following AASHTO Tests:

AASHTO M 281 Weight

AASHTO M 281 Length

Noncompliant Material and Price Adjustment: Noncompliant material is not accepted. Material is returned to the manufacturer and replaced with acceptable material. Price adjustments are not in place for this material.

340.03.09.07 Steel Fence Posts or Braces for Chain Link Fences.

Testing of Steel Pipe Consists of the Following AASHTO and ASTM Tests:

ASTM F 1083 Outside Diameter

ASTM F 1083 Inside Diameter

ASTM F 1083 Wall Thickness

AASHTO M 181 Weight of Post

AASHTO M 181 Length of Post

AASHTO M 181 Zinc Coating Thickness

AASHTO M 281 Yield Point

Noncompliant Material and Price Adjustment: Noncompliant material is not accepted. Material is returned to the manufacturer and replaced with acceptable material. Price adjustments are not in place for this material.

340.03.09.08 Tension Wire and Accessories and Hardware.

Testing of Tension Wire and Accessories Consists of the Following AASHTO and ASTM Tests:

AASHTO M 181 Size of Wire

AASHTO T 68	Breaking Strength
AASHTO T 65	Mass of Coating
ASTM A 116	Zinc Coating on Steel Fence

Noncompliant Material and Price Adjustment: Noncompliant material is not accepted. Material is returned to the manufacturer and replaced with acceptable material. Price adjustments are not in place for this material.

340.03.10 Glass Beads.

Sample Frequency: According to the Idaho Field Test Manual Part II.

Forms:

ITD-1044	Sample Information for Testing
ITD-839	Glass Beads Work Sheet
ITD-844	Report of Tests on Glass Beads

Test Methods:

FSTM TT-B-1325D	Beads, (Glass Spheres), Retro-Reflective
AASHTO M 247	Specification for Glass Beads Used in Traffic Paints (Type I)
Special IDAHO Test	Adherence and Anti-Wetting Coating Tests

Testing of Glass Beads Consists of the Following Federal and AASHTO Tests:

FSTM TT-B-1325D*	Appearance
FSTM TT-B-1325D*	Roundness
FSTM TT-B-1325D*	Index of Refraction
FSTM TT-B-1325D*	Specific Gravity
FSTM TT-B-1325D*	Gradation A
FSTM TT-B-1325D*	Resistance to Acid
FSTM TT-B-1325D*	Resistance to Calcium Chloride
FSTM TT-B-1325D*	Resistance to Sodium Sulfide
FSTM TT-B-1325D*	Water Resistance
Special IDAHO Test	Adherence Coating
Special IDAHO Test	Anti-wetting Coating

Noncompliant Material and Price Adjustment: Noncompliant material is not accepted. The product is returned to the manufacturer and replaced with an acceptable product. Price adjustments are not in place for this material.

340.03.11 Lime/Quicklime Products.

Sample Frequency: According to the Idaho Field Test Manual Part II.

Forms:

ITD-1044	Sample Information for Testing
ITD-800	Report of Tests on Material

Test Methods:

ASTM C 110	Test Methods for Physical Testing of Quicklime, Hydrated Lime, and Limestone
ASTM C 977	Specification for Quicklime and Hydrated Lime for Soil Stabilization
ASTM C 25	Test Methods for Chemical Analysis of Limestone, Quicklime, and Hydrated Lime

Testing of Quicklime Consists of the Following ASTM Tests:

ASTM C 25	Calcium Oxide on LOI Free Basis
ASTM C 25	Magnesium Oxide on LOI Free Basis
ASTM C 110	Fineness, Weight % Passing Through a 1" Sieve
ASTM C 110	Total Residue
ASTM C 977	Non-Lime Residue

340.03.12 Waterborne Traffic Line Paint.

Sample Frequency: According to the Idaho Field Test Manual Part II or ITD contract.

Forms:

ITD-1044	Sample Information for Testing
ITD-941	Worksheet for Paint
ITD-841	Report of Tests on Paint

Test Methods:

AASHTO M 249	White and Yellow Reflective Thermoplastic Striping Material (Solid Form)
ASTM C 666	Test Method for Resistance of Concrete to Rapid Freezing and Thawing
ASTM E 303	Test Method for Measuring Surface Frictional Properties Using the British Pendulum Tester
ASTM D 823	Practices for Producing Films of Uniform Thickness of Paint, Varnish, and Related Products on Test Panels
ASTM D 562	Test Method for Consistency of Paints Using the Stormer Viscometer
ASTM D 1475	Test Method for Density of Paint, Varnish, Lacquer, and Related Products
ASTM D 2369	Test Method for Volatile Content of Coatings
ASTM D 3723	Test Method for Pigment Content of Water Emulsion Paints by Low Temperature Ashing
ASTM D 2243	Test Method for Freeze-Thaw Resistance of Waterborne Coatings
ASTM D 2805	Test Method for Hiding Power of Paint by Reflectometry
ASTM D 2486	Test Method for Scrub Resistance of Wall Paints
ASTM D 1394	Test Methods for Chemical Analysis of White Titanium Pigments
ASTM E 1347	Test Methods for Color and Color-Difference Measurement by Tristimulus (Filter) Colorimetry
ASTM D 522	Test Methods for Mandrel Bend Test of Attached Organic Coatings
ASTM D 969	Test Method for Laboratory Determination of Degree of Bleeding of Traffic Paint
ASTM D 1005	Test Methods for Measurement of Dry-Film Thickness of Organic Coatings Using Micrometers
ASTM D 1293	Test Methods for pH of Water
ASTM D 711	Test Method for No-Pick-Up Time of Traffic Paint
FTMS 4051.1	Vehicle Solids (Ordinary Centrifuge)
FTMS 6131	Yellowness Index

Testing of Waterborne Traffic Line Paint Consists of the Following ASTM and Federal Tests:

ASTM D 823	Color

ASTM D 562	Viscosity or Consistency at 50°C
ASTM D 562	Viscosity or Consistency at 25°C
ASTM D 562	Viscosity or Consistency at 10°C
ASTM D 711	Drying Time (Early Washout)
ASTM D 1475	Weight Per Liter
ASTM D 2369	Total Solids
ASTM D 3723	Pigment Solids
FSTM 4051.1	Vehicle Solids
ASTM D 869	Settling
ASTM D 2243	Freeze-thaw
ASTM D562	Static Heat Stability
ITD-T	Skinning
ASTM D 2805	Contrast Ratio
ASTM D 2486	Scrub Resistance
ASTM D 1394	Pigment Composition
ASTM E 1347	Directional Reflectance
ASTM D 522	Flexibility
ASTM D 969	Bleeding Ratio
ASTM D 661	Cracking
FSTM 6131	Yellowness Index

Noncompliant Material and Price Adjustment: Price adjustments will be assessed on product cost, excluding freight. Determination of the price adjustment to be applied will be based on ITD Materials Laboratory testing procedures. Total price adjustments will not exceed 50% or complete rejection.

Density (kg/L)

Deviation (±), % of spec. value	Price Adjustment
< 0.040 kg/L	None

> 0.041 – 0.060	25%
> 0.061 and greater	50% or rejection

Viscosity (Krebs Units)

Deviation (±), % of spec. value	Price Adjustment
1 – 2 K.U.	None
3 – 5 K.U.	25%
< 5 K.U.	50% or rejection

Scrub Resistance (Cycles)

Deviation (±), % of spec. value	Price Adjustment
975 – 999	None
950 – 974	25%
Below 950	50% or rejection

pH (standard units)

Deviation (±), % of spec. value	Price Adjustment
9.5 – 9.6	25%
Below 9.5	50% or rejection

The price adjustments will be based on the paint price F.O.B.

340.03.13 Coating Systems (All Formulas).

Sample Frequency: According to the Idaho Field Test Manual Part II or ITD contract.

Forms:

ITD-1044	Sample Information for Testing
ITD-941	Worksheet for Paint
ITD-841	Report of Tests on Paint

Test Methods:

AASHTO M 249	White and Yellow Reflective Thermoplastic Striping Material (Solid Form)
ASTM C 666	Test Method for Resistance of Concrete to Rapid Freezing and Thawing

ASTM E 303	Test Method for Measuring Surface Frictional Properties Using the British Pendulum Tester
ASTM D 823	Practices for Producing Films of Uniform Thickness of Paint, Varnish, and Related Products on Test Panels
ASTM D 562	Test Method for Consistency of Paints Using the Stormer Viscometer
ASTM D 1475	Test Method for Density of Paint, Varnish, Lacquer, and Related Products
ASTM D 2369	Test Method for Volatile Content of Coatings
ASTM D 3723	Test Method for Pigment Content of Water Emulsion Paints by Low Temperature Ashing
ASTM D 2243	Test Method for Freeze-Thaw Resistance of Waterborne Coatings
ASTM D 2805	Test Method for Hiding Power of Paint by Reflectometry
ASTM D 2486	Test Method for Scrub Resistance of Wall Paints
ASTM D 1394	Test Methods for Chemical Analysis of White Titanium Pigments
ASTM E 1347	Test Methods for Color and Color-Difference Measurement by Tristimulus (Filter) Colorimetry
ASTM D 522	Test Methods for Mandrel Bend Test of Attached Organic Coatings
ASTM D 969	Test Method for Laboratory Determination of Degree of Bleeding of Traffic Paint
ASTM D 1005	Test Methods for Measurement of Dry-Film Thickness of Organic Coatings Using Micrometers
ASTM D 1293	Test Methods for pH of Water
ASTM D 711	Test Method for No-Pick-Up Time of Traffic Paint
FSTM 4051.1	Vehicle Solids (Ordinary Centrifuge)
FSTM 6131	Yellowness Index
ASTM D 5402	Practice for Assessing the Solvent resistance of Organic Coatings Using Solvent Rubs
ASTM D 869	Test Method for Evaluating Settling of Paint
ASTM D 562	Static Heat
ITD-T	Skinning
ASTM D 661	Test Method for Evaluating Degree of Cracking of Exterior Paints

ASTM E 303	Test Method for Measuring Surface Friction Properties Using a British Pendulum Tester
ASTM D 823	Practices For Producing Films of Uniform Thickness of Paint, Varnish, and Related Products on Test Panels
ASTM D 5895	Test Method for Measuring Times of Drying or Curing During Film Formation of Organic Coatings Using Mechanical Recorders
FSTM TT-P-115	Solvent Borne Traffic Line Paint Dry-Through Times No-Pickup Recoat Times

Testing of Coating Systems Consists of the Following ASTM Tests:

ASTM D 562	Viscosity or Consistency at 25°C
ASTM D 1475	Weight per Liter
ASTM D 2369	Total Solids
ASTM D 823	Color
ASTM D 5895	Cure Time
ASTM D 5402	Recoat Time
ASTM D 5402	Dry-Through Time
ASTM D 5402	Solvent Resistance

Noncompliant Material and Price Adjustment:

Density (kg/L)

Deviation (±), % of spec. value	Price Adjustment
< 0.040 kg/L	None
> 0.041 – 0.060	25%
> 0.061 and greater	50% or rejection

Viscosity (Krebs Units)

Deviation (±), % of spec. value	Price Adjustment
1 – 2 K.U.	None
3 – 5 K.U.	25%
< 5 K.U.	50% or rejection

Solids (%)

Deviation (±), % of spec. value	Price Adjustment
1%	None
2 – 3%	25%
4 – 5%	50% or rejection

340.03.14 Pavement Markings – Thermoplastic.

Sample Frequency: As determined by ITD contract.

Forms:

ITD-1044	Sample Information for Testing
ITD-941	Worksheet for Paint
ITD-841	Report of Tests on Paint

Test Methods:

AASHTO M 249	Specific Gravity
AASHTO M 249	Composition
AASHTO M 249	Daylight Reflectance
AASHTO M 249	Drying Time
AASHTO M 249	Cracking Resistance at Low Temperature
AASHTO M 249	Impact Resistance
AASHTO M 249	Softening Point
AASHTO M 249	Flowability
AASHTO M 249	Yellowness Index
ASTM E 303	Skid Resistance
ASTM D 823	Material Thickness
ASTM C 666	Bonding
ASTM E 303	Material Resistance British Pendulum Number Skid Resistance, Friction

Testing of Pavement Markings-Thermoplastic Consists of the Following AASHTO and ASTM Tests:

AASHTO M 249	Specific Gravity
AASHTO M 249	Composition
AASHTO M 249	Daylight Reflectance
AASHTO M 249	Drying Time
AASHTO M 249	Cracking Resistance at Low Temperature
AASHTO M 249	Impact Resistance
AASHTO M 249	Softening Point
AASHTO M 249	Flowability
AASHTO M 249	Yellowness Index
ASTM E 303	Skid Resistance
ASTM D 823	Material Thickness
ASTM C 666	Bonding
ASTM E 303	Material Resistance British Pendulum Number Skid Resistance, Friction

Noncompliant Material and Price Adjustment: Noncompliant material is not accepted. The product is returned to the manufacturer and replaced with an acceptable product. Price adjustments are not in place for this material.

340.03.15 Soils.

Sample Frequency: According to the Idaho Field Test Manual Part II.

Forms:

ITD-1044	Sample Information for Testing
ITD-800	Report of Tests on Material

Test Methods:

USDA Soil Method	Specific Conductance of 1:1 and 1:5 Extracts of Soil
USDA Soil Method 21	pH Determination
USDA Soil Method 13	Chloride by Titration with Silver Nitrate
USDA Soil Method 14a	Sulfate by Precipitation in Barium Sulfate
EPA 200.7	Arsenic

EPA 200.7	Barium
EPA 200.7	Cadmium
EPA 200.7	Chromium
EPA 200.7	Lead
EPA 245.1	Mercury
EPA 200.7	Selenium
EPA 200.7	Silver

Testing of Soils Consists of the Following EPA and USDA Tests:

USDA Soil Method	Specific Conductance
USDA Soil Method 21	pH Determinations
USDA Soil Method 13	Chloride
USDA Soil Method 14a	Sulfate
EPA 200.7	Arsenic
EPA 200.7	Barium
EPA 200.7	Cadmium
EPA 200.7	Chromium
EPA 200.7	Lead
EPA 245.1	Mercury
EPA 200.7	Selenium
EPA 200.7	Silver

Testing Tolerances: None.

Noncompliant Material and Price Adjustment: Not applicable.

340.03.16 Water for Concrete, Grout, and Mortar.

Sample Frequency: According to the Idaho Field Test Manual Part II.

Forms:

ITD-1044	Sample Information for Testing

ITD-800	Report of Tests on Material

Test Methods:

AASHTO T 26	Quality of Water to be Used in Concrete
ASTM D 512	Test Methods for Chloride Ion in Water
ASTM D 516	Test Method for Sulfate Ion in Water
AASHTO T 26	Total Solids and Inorganic Matter
ASTM D 1125	Test Methods for Electrical Conductance and Resistivity of Water
ASTM D 1293	Test Methods for pH of Water

Testing of Water for Concrete, Grout, and Mortar Consists of the Following ASTM and AASHTO Tests:

AASHTO T 26	Quality of Water to be Used in Concrete
ASTM D 512	Chloride Ion in Water
ASTM D 516	Sulfate Ion in Water
AASHTO T 26	Total Solids and Inorganic Matter
ASTM D 1125	Conductance and Resistivity of Water
ASTM D 1293	pH of Water

Noncompliant Material and Price Adjustment: Noncompliant material is not accepted. Another source of water for concrete is located, sampled, and tested for compliance. Price adjustments are not in place for this material.

340.03.17 Hazardous Materials and Waste – Paint Chips, Used Sanding Material, and Sludge.

Sample Frequency: As required.

Forms:

ITD-1044	Sample Information for Testing
ITD-800	Report of Tests on Material

Test Methods:

EPA 200.7	Inductively Coupled Plasma-Atomic Emission Spectrometric Method for Trace Element Analysis of Water and Wastes

EPA SW 846 3015	Extraction Procedure
EPA 9020	Total Organic Halogens
EPA SW 846 7470	Mercury Analysis
EPA SW 846 6010	Heavy Metals Analysis by Atomic Absorption Spectroscopy
EPA 8015.mod	Gasoline
EPA 8015.mod	Diesel
EPA 300.0	Chloride Analysis
USDA Soil Method 24	Organic Matter
EPA 245.1	Mercury

Testing Tolerances: As specified in the methods.

Noncompliant Material and Price Adjustment: Not applicable.

340.03.18 Used Lubricating and Hydraulic Oils.

Sample Frequency: According to ITD's Preventative Maintenance Program.

Form:

ITD-945	Preventive Maintenance Oil Analysis Sample

Test Methods:

ASTM D 445	Test Method for Kinematic Viscosity of Transparent and Opaque Liquids (the Calculation of Dynamic Viscosity)
ASTM E 1252	General Techniques for Qualitative Infrared Analysis
ASTM D 4206	Test Method for Sustained Burning of Liquid Mixtures by the Seta-flash Tester (Open Cup)
ASTM D 6595 (Pending approval)	Determination of Wear Metals and Contaminants in Used Lubricating Oils or Used Hydraulic Fluids by Rotating Disc Electrode Atomic Emission Spectroscopy

Testing of Used Lubricating and Hydraulic Oils Consists of the Following ASTM Tests:

ASTM D 445	Viscosity
ASTM D 4206	Flashpoint

ASTM D 6595	Aluminum
ASTM D 6595	Barium
ASTM D 6595	Boron
ASTM D 6595	Calcium
ASTM D 6595	Chromium
ASTM D 6595	Copper
ASTM D 6595	Iron
ASTM D 6595	Lead
ASTM D 6595	Magnesium
ASTM D 6595	Molybdenum
ASTM D 6595	Nickel
ASTM D 6595	Phosphorus
ASTM D 6595	Potassium
ASTM D 6595	Silicon
ASTM D 6595	Silver
ASTM D 6595	Sodium
ASTM D 6595	Tin
ASTM D 6595	Titanium
ASTM D 6595	Vanadium
ASTM D 6595	Zinc
ASTM E 1252	Fuel (diesel and gasoline)
ASTM E 1252	Soot
ASTM E1252	Water
ASTM E1252	Glycol

Testing Tolerances: According to laboratory-determined acceptable ranges.

Noncompliant Material and Price Adjustment: Not applicable.

SECTION 350.00 – ASPHALT LABORATORY

The Central Materials Asphalt Laboratory is responsible for assuring the quality of all bituminous products purchased by the state of Idaho for highway paving projects, seal coats, and maintenance. Testing equipment must always operate and testing procedures must always be performed at AASHTO Standards. Laboratory operating procedures must be understandable, concise, and consistent. It is also important that the districts and the Asphalt Suppliers know and understand the operating procedures. AMRL Accreditation requirements must be maintained.

350.01 Forms. The following ITD forms are used in this laboratory to calculate and report test results:

- ITD-1045 Asphalt Sample Data Sheet
- ITD-829 Report of Tests on Liquid Asphalt/Asphalt Cement
- Unnumbered Report of Tests on Performance Graded Binder
- ITD-929 Asphalt Data Sheet – Complete (Worksheet)
- ITD-925 Asphalt Data Sheet – Routine (Worksheet)
- ITD-930 Report of Tests on Emulsified Asphalt (Worksheet)

350.02 Testing Procedures. Specifications governing the quality of asphalt are found in our Standard Specifications for Highway Construction, Section 702. All of our Asphalt Test Methods are American Association of State Highway and Transportation Officials, with the exception of Detection of Anti-Strip Additive (Idaho T-99) and Elastic Recovery (AASHTO-AGC-ARTBA J.C., Task Force 31, Appendix B).

Asphalt samples received by the Asphalt Laboratory for testing fall within five general types:

1. Performance Graded Binders
2. Cutback Asphalt
3. Emulsified Asphalt
4. Viscosity Graded Asphalt Cements and Polymerized Asphalt Cements
5. Special Products (Crack Filler, Bituminous Coatings, Anti-Strip Additive Approval, etc.)

Asphalt samples received from a project will be tested as complete or routine samples. Complete testing includes a series of tests as outlined in the next section. A routine test involves one or two tests.

350.02.01 Performance Graded Binders. Testing frequency for Performance Graded Binders will be a complete test for every 400 tons of product used. Complete testing of Performance Graded Binders consists of the following tests found In AASHTO Provisional Standards.

Flash C.O.C.	T 48
Brookfield Viscosity	TP 48
Dynamic Shear	TP 5
Rolling Thin Film Oven Test	T 240
Dynamic Shear on RTF Residue	TP 5
Pressure Aging Vessel	PP 1
Dynamic Shear on PAV Residue	TP 5
Bending Beam (Creep Stiffness)	TP 1
Direct Tension	TP 3
Elastic Recovery	(AASHTO-AGC-ARTBA J. C., Task Force 31, Appendix B)

Idaho T-99 is also performed as part of complete testing.

350.02.02 Cutback Asphalt (MC-70, MC-350, MC-800, etc.). The first sample of a project is tested as a complete (Identification No. 2001-C). Complete testing will be performed on every tenth sample thereafter (2010-C, 2020-C, etc.). Routine testing will be performed on all other samples. Complete testing of cutback asphalt consists of the following AASHTO tests.

Flash T.O.C.	T 79
Kinematic Viscosity	T 201
Specific Gravity	T 228
Distillation	T 78
Absolute Viscosity on Distillation Residue	T 202

Routine testing of cutback asphalt:

Kinematic Viscosity	T 201

350.02.03 Emulsified Asphalt. Emulsified asphalt is divided into three groups.

1. Seal Coat Emulsions (CRS-2, CRS-2R, CRS-P, etc.)
2. Tack Coats and Fog Seals (CSS-1, SS-1, etc.)
3. Cold Mix Recycle Emulsions (CMS-2, CMS-2s, etc.)

Seal Coat Emulsions are tested in conjunction with District Seal Coat Field Viscosity Testing. All samples, whether field tested or not, are sent to the Central Materials Laboratory. If samples have been field tested, the Materials Laboratory will perform the following AASHTO tests.

Residue by Evaporation	T 59
Penetration on Residue	T 49

If viscosity has not been performed in the field, the Central Materials Laboratory will test for Viscosity (AASHTO T 59, Consistency Test) and Saybolt Viscosity (AASHTO T 72). All attempts will be made to perform viscosities within 30 days of the day of sampling. When the workload becomes heavy and there are two or more samples representing the same delivery ticket number, only one of these samples needs to be tested. If the sample passes, all samples representing the delivery ticket will be considered acceptable.

Tack Coat and Fog Seal Emulsion testing will include the following AASHTO tests.

Consistency Test (Saybolt Viscosity at 25°C or 77°F)	T 59 and T 72
Residue by Evaporation	T 59
Penetration of Residue	T 49

Cold Mix Recycle Emulsion testing will include the following AASHTO tests.

Consistency Test (Saybolt Viscosity at 50°C or 122°F)	T 59 and T 72
Residue by Evaporation	T 59
Penetration of Residue	T 49

The following procedure is used to perform the Evaporation Test:

- The 50 gram samples of emulsion are cooked on a hot plate until all foaming is finished.
- Follow with an oven treatment at 325°F for one hour.

350.02.04 Asphalt Cements (AC-5, AC-10, AC-20, Type II-C, PBA-3, PBA-6, etc.). The first sample of a project is tested as a complete (Identification No. 2001-C). Routine tests will be performed on 2006-C and 2011-C followed by a complete test on 2016-C. This pattern of testing frequency will continue through the rest of the project. (2021-C and 2026-C will be routines, 2031-C a complete; 2036-C and 2041-C routines, 2046-C a complete; etc.)
Complete testing of Asphalt Cements consists of the following AASHTO tests.

Absolute Viscosity	T 202
Kinematic Viscosity	T 201
Penetration	T 49
Flash C.O.C.	T 48
Rolling Thin Film Oven Test	T 240
Absolute Viscosity on Residue	T 202

Routine testing of asphalt cements consists of the following AASHTO tests.

Absolute Viscosity	T 202
Penetration	T 49

Idaho T-99 anti-strip detection is also performed, as required, as part of complete and routine testing. Asphalt cement samples are preheated and held for testing at temperatures under 300°F. Sample cans with 1 1/2" openings for pouring are preferred. The lids are to be left on tightly until the sample is tested.

350.03 Testing Tolerances and Price Adjustments. The following sections give the values for testing tolerances and the price adjustment required if the asphalt samples are not within the tolerance range.

350.03.01 Performance Graded Binders.

Flash Point C.O.C. (230°C minimum 450°F)

Deviation (–), % of Spec. Value	Price Adjustment
0 to 8	0%
8.5 to 16	10%
16.5 +	25%

Brookfield Viscosity (3 Pa.S. maximum)

Deviation (+), % of Spec. Value	Price Adjustment
0 to 10	0%
10.5 to 20	10%
20.5 +	25%

Dynamic Shear – Original (1.0 kPa minimum) and Rolling Thin Film Residue (2.2 kPa minimum)

Deviation (–), % of Spec. Value	Price Adjustment
0 to 10	0%
10.5 to 20	10%
20.5 +	25%

Dynamic Shear – PAV Residue (5000 kPa maximum)

Deviation (+), % of Spec. Value	Price Adjustment
0 to 10	0%
10.5 to 20	10%
20.5 +	25%

Rolling Thin Film Oven Test (1.0% maximum loss)

Deviation Mass (+), % of Spec. Value	Price Adjustment
0 to 20	0%
20.5 to 40	10%
40.5 +	25%

Bending Beam (Stiffness, 300 MPa maximum)

Deviation (+), % of Spec. Value	Price Adjustment
0 to 5	0%
5.5 to 10	10%
10.5 +	25%

Bending Beam (Slope, m-value .300 minimum)

Deviation (–), % of Spec. Value	Price Adjustment
0 to 5	0%
5.5 to 10	10%
10.5 +	25%

Elastic Recovery (50% minimum at 25°C)

Deviation	Price Adjustment
Under 50%	25%

Out-of-specification performance graded binder will be assessed a price adjustment based on the contractor's supplier price. The PG Binder will be clearly identified by "lot" and price reduction will be assessed on the entire lot.

350.03.02 Cutback Asphalt.

Flash Point T.O.C.

Deviation (–), % of Spec. Value	Price Adjustment
0 to 8	0%
8.5 to 16	15%
16.5 +	25%

Kinematic Viscosity at 60°C (140°F)

Deviation (+), % of Spec. Value		Price Adjustment
Below 3000 CST	3000 to 6000 CST	
0 to 3	0 to 9	0%
3.5 to 6	9.5 to 18	15%
6.5 +	18.5 +	25%

Distillation

Deviation (+) from Spec. Value Distillation Fractions and % Residue	Price Adjustment
0 to 2	0%
2.5 to 4	15%
4.5 +	25%

Absolute Viscosity

Deviation (+), % of Spec. Value	Price Adjustment
0 to 10	0%
10.5 to 20	15%
20.5 +	25%

The specification cutback asphalt sample will be assessed a price adjustment based on the contractor's supplier price.

350.03.03 Emulsified Asphalt.

Saybolt Viscosity

Deviation (+), % of Spec. Value		Price Adjustment
25°C (77°F)	50°C (122°F)	
0 to 15	0 to 21	0%
15.5 to 30	21.5 to 42	15%
30.5 +	42.5 +	25%

Residue by Evaporation

Deviation Mass (–), % of Spec. Value	Price Adjustment
0 to 1	0%
1.5 to 2	15%
2.5 +	25%

Penetration of Residue

Deviation Below Minimum Spec. Value, %	Price Adjustment
0 to 16	0%
16.5 to 24	15%
24.5 +	25%

Deviation Above Maximum Spec. Value, %	Price Adjustment

0 to 8	15%
8.5 +	25%

When a failure occurs, any remaining samples representing that delivery ticket number must be tested. A price adjustment will be based on the contractor's supplier price.

350.03.04 Asphalt Cements.

Absolute Viscosity – Original and Residues at 60°C (140°F)

Deviation (+), % of Spec. Value	Price Adjustment
0 to 10	$0
10.5 to 20	$300
20.5 +	$500

Kinematic Viscosity at 135°C (275°F)

Deviation (+), % of Spec. Value	Price Adjustment
0 to 9	$0
9.5 to 18	$300
18.5 +	$500

Penetration at 25°C (77°F)

Deviation (+), % of Spec. Value	Price Adjustment
0 to 8	$0
8.5 to 16	$300
16.5 +	$500

Flash Point C.O.C.

Deviation (–), % of Spec. Value	Price Adjustment
0 to 8	$0
8.5 to 16	$300
16.5 +	$500

Rolling Thin Film Oven Test

Deviation Mass (+), % of Spec. Value	Price Adjustment
0 to 40	$0
40.5 to 80	$300
80.5 +	$500

Each sample of asphalt cement tested represents a "lot" of five trucks or trailers or any combination thereof. If a failure occurs, a flat rate price reduction will be assessed against the entire lot. No additional samples from that lot will normally be tested. If a failure occurs on a project fewer then five loads, the price reduction will be prorated with the number of loads used.

Idaho T-99 Anti-Strip Test

Deviation	Price Adjustment
Negative	25%

An additional tolerance for test results is allowed for material that contains anti-strip.

	Deviation
Increase in Original Penetration	8%
Decrease in Original Absolute Viscosity	10%
Decrease in Kinematic Viscosity (AC Grades only)	9%

350.04 Noncompliant Material and Price Adjustment Letters. In the event of a failing asphalt test result, repeat the test after making sure that all methods, procedures, equipment, and specifications are correct. If the sample passes specifications upon retest, report the sample as passing.

If the sample fails on retest, treat it as a priority and report the average test results. The test report with the failure on it will be published on pink paper. Failing samples are retained in the laboratory for one year.

350.05 Asphalt Price Adjustment Letters. When submitting a report that includes out-of-specification material, a Price Adjustment Letter must be included. The letter should include only one supplier's failures. Do not use different suppliers and different contracts in the same letter. There are two versions of the Price Adjustment Letter. One refers to price adjustments based on F.O.B. contractor's supplier price and is used when assessing penalties to Cutback Asphalt and Emulsified Asphalt. The other version refers to flat rate reductions commonly used for Asphalt Cements. A rough draft should accompany each test report to be used by the office staff to produce a master letter. This master will accompany the test reports for distribution as directed.

SECTION 360.00 – STRUCTURES LABORATORY

Structures Laboratory: This laboratory tests the physical and mechanical properties of all materials related to highway construction and the fabrication of structures, both concrete and steel. The testing may be performed in the laboratory or in the field, using destructive and/or nondestructive testing methods. All testing is accomplished in accordance with AASHTO and ASTM Test Methods and Specifications under the direction of the Quality Control Engineer. Sampling is performed at the project sites, or from the suppliers stock, then brought into the Structures Laboratory, received, and distributed to the appropriate areas for testing. AASHTO and CCRL accreditation requirements are maintained.

Cement Laboratory: In this laboratory, physical testing of cementacious materials is performed. Cements, Types I, I and II, and III, are tested for specific properties designated by AASHTO and ASTM to ensure quality and consistency of the product. AASHTO and CCRL accreditation

requirements are maintained. Samples are taken from the concrete supplier's storage, silos or bulker trucks. Cement samples brought into the laboratory are randomly sampled for chemical and physical analysis. All physical testing on cements is performed. Mortar pats are made for the Chem Laboratory which are used for testing curing compounds.

Inspection of Concrete: Personnel from the Structures Section normally perform inspection of precast concrete components. Products inspected are numerous styles of girders, slabs, stiff legs, pipe, and wall panels, as well as decks and structures. This inspection is performed in-state and out-of-state for Idaho projects. Inspection is performed in accordance with project requirements, Standard Specifications for Highway Construction, and PCI (Precast Concrete Institute). Field testing of concrete is required on most projects. Testing is performed in accordance with AASHTO and ASTM requirements.

Nuclear Gauge Program: The administration of the nuclear gauge program is handled through the Central Materials Laboratory. A person within the laboratory who is qualified as a Radiation Safety Officer (RSO) will manage this program statewide and deal with the Nuclear Regulatory Commission (NRC). The RSO will ensure that all personnel will be trained in the safe handling and proper usage of nuclear equipment according to the policies and regulations set by the NRC. All personnel shall be provided with the proper equipment to perform their duties. Districts, operators, and equipment will be monitored on a routine basis for conformance to policies and regulations. Failure to comply could result in stiff penalties and fines to ITD as well as the individual.

Central Materials Laboratory: The Central Materials Laboratory will carry the license, provide policies and regulations, and maintain a line of communication with the NRC. They will provide all essential training to personnel within the program. Required classes include the following:

- An 8-hour Nuclear Gauge Certification Class (NRC approved).
- Gauge operator classes or on-the-job training.
- Refresher classes at a frequency not exceeding 3 years.

Refresher classes may be instructed by state personnel familiar with the subject matter, such as the ITD RSO or a District RSO. Information presented must cover regulatory compliance, transportation, personal monitoring, emergency response, and general safety with radioactive materials.

The Central Materials Laboratory will provide, administrate, and fund a program monitoring personal exposure to radiation, i.e., personal dosimetry, as well as provide, administrate, and fund a leak testing program. The Central Laboratory will assign gauges to districts and conduct a gauge inventory every six months, or as requested, and provide a depot with storage for gauges that require repair or recalibration. The Central Materials Laboratory shall maintain records on personnel, training, dosimetry, and gauges and will provide personnel exposure records to District RSOs and certification cards to qualified operators. The Central Materials Laboratory will oversee the procurement and funding of new gauges, as well as disposal of old gauges according to NRC regulations.

District Materials Laboratories: The District RSOs will distribute and collect Thermoluminescent Dosimeters (TLDs) at specified intervals and provide exposure records to gauge users. In addition, they will distribute certification cards as required, provide a permanent gauge storage area, assign gauges to residencies as needed, and provide shipping

papers and documents. District RSOs will ensure that nuclear devices are being used safely, transported correctly, and TLDs worn during gauge use. They will also perform wipe tests on nuclear devices as requested.

District Residencies: Residencies will assign gauges to operators/projects with provisions for temporary storage sites, when necessary, and document the location. In addition, they will ensure proper use of nuclear devices and see that each user has a certification card, TLD, proper shipping papers, and a properly secured and labeled gauge.

Verification of Portable Scales: Every three months, personnel in the Structures Laboratory perform load verification of portable scales for the Port-of-Entry (POE), County Sheriff, and Boise Police. A universal test machine, which is certified by NIST standards every 12 months or less, is used to verify the portable scales. Scale certification is performed in accordance with parts 137.0 in the POE Operations Manual.

360.01 Testing of Material. Materials used in highway construction must comply with specified criteria as outlined in ITD's Standard Specifications for Highway Construction. The bulk of the testing performed in the Structures Laboratory can be found in Sections 409, 502, 506, and 703. The laboratory is AASHTO accredited. The majority of the tests performed are AASHTO Test Methods; however, there are some ASTM and Idaho Test methods being utilized.

Samples received will generally fall into one of two categories, either concrete or steel products. Material and application dictate which tests will be performed. Occasionally the Project Engineer specifies a series of tests to be run which are not routine, these will be indicated on the ITD-1044 form (Sample Data Sheet).

The following information is a complete listing of tests, specifications, and forms that are currently being used in the Structures Laboratory. Test methods and specifications are AASHTO unless otherwise noted.

360.01.01 Cement.

Test	Test Methods	Specifications
Sampling	T 127	M 85
Mechanical Mixing	T 162	T 162
Compressive Strength	T 106	M 85
Autoclave Expansion	T 107	M 85
Normal Consistency	T 129	M 85
Time of Set (Vicat)	T 131	M 85
Time of Set (Gilmore)	T 162 & T 154	M 85
Specific Gravity	T 133	M 85
Air Content	T 137	M 85
False Set (Paste Method)	T 162 & T 186	M 85
Flow Table & Caliper		M 152

Forms: ITD-1044 and ITD-910

360.01.02 Concrete Aggregate.

Test	Test Methods	Specifications
Sampling	T 2	409, 502 & 703 (Idaho)
Unit Weight	T 19	M 6
Organic Impurities	T 21	M 6
Sieve Analysis	T 27	M 6
Mortar Strength	T-13 (Idaho)	M 6
Specific Gravity, FA	T 84	
Specific Gravity, CA	T 85	
L.A. Wear, CA	T 96	M 80
Sand Equivalent	T 176	703 (Idaho)

Forms: ITD-1044, ITD-801 and ITD-906

360.01.03 Concrete.

Test	Test Methods	Specifications
Compressive Strength	T 22	409 & 502 (Idaho)
Obtaining & Testing Cores	T 24	409 & 502 (Idaho)
Slump	T 119	409 & 502 (Idaho)
Unit Weight, Fresh	T 121	From Mix Design
Laboratory Produced Concrete (Idaho)	T 126	409 & 502
Sampling Fresh Concrete	T 141	409 & 502 (Idaho)
Air Content, Pressure Method	T 152	409 & 502 (Idaho)
Capping Concrete Cylinders	T 231	T 231
Mix Design, Absolute Volume	T 126	409 & 502 (Idaho)
Single Use Molds		M 205
Moist Cabinets & Curing Tanks		C 511 (ASTM)
Unit Weight, Hardened Concrete	T 106 (Idaho)	

Forms: ITD-845E, ITD-845M, ITD-911, ITD-867 and ITD-1044

360.01.04 Steel for Concrete Reinforcement.

Test	Test Methods	Specifications
Deformed Billet – Steel Bars	T 68 & T 244	M 31
Cold Drawn Steel Wire	T 68 & T 244	M 32
Welded Wire Fabric	T 68 & T 244	M 55
Uncoated Seven-Wire Strand	T 68 & T 244	M 203
Uncoated Stress Relieved Wire	T68 & T 244	M 204

Test	Test Methods	Specifications
High Strength Alloy Bars	T 68 & T 244	M 215
Carbon Steel Bars, Plain Round	T 68 & T 244	M 227

Forms: ITD-1044, ITD-812, ITD-912, ITD-838, ITD-938 and ITD-818

360.01.05 Steel Plate Fasteners.

Test	Test Methods	Specifications
Hi-Strength Bolts	T 68 & T 244	M 164
Hi-Strength Nuts	RC Assembly	M 292
Hardened Washers	RC Assembly	M 293
DTIs (Direct Tension Indicators)	RC Assembly	F 959 (ASTM)
Brinell Hardness	T 70	
Rockwell Hardness	T 80	

Forms: ITD-1044, ITD-814 and ITD-815

360.01.06 Building Block Materials.

Test	Test Methods	Specifications
Blocks & Bricks	T 32	M 89 & M 114
Mortar & Grout Aggregate		C 144 & C 404 (ASTM)
Mortar	C 91 (ASTM)	C 270 (ASTM)
Flow or Grout	C 939 (ASTM)	Special Provisions

Forms: ITD-814, ITD-849, ITD-916, ITD-867 and ITD-1044

360.01.07 Joint Filler.

Test	Test Methods	Specifications
Sampling & Testing Joint Filler	T 42	M 153 & M 213

Forms: ITD-1044, ITD-815 and ITD-915

360.01.08 Miscellaneous Testing. Various AASHTO and ASTM Methods.

Forms: ITD-1044 and ITD-800